DESIGNING AND IMPLEMENTING MOBILE-BASED INTERVENTIONS FOR ENHANCING ENGLISH VOCABULARY IN ODL

by

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I declare that the above thesis is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

_____ SIGNATURE

_____ DATE

DEDICATION

This thesis is dedicated to my husband, Puti Joseph Phetla; my three blessings, Mthokozisi Luyanda, Kgonthe Mapule and baby Lethabo; my parents, Duduzile Busi Ethel and Thembalethu Valentine Ndaba and my mother, Letty Mapule Phetla; my siblings, Mlungisi, Bhekumuzi, Nomonde, Sthembile and Sphenduliwe; my Grandparents, Gogo and Mkhulu Nene, Gogo Ndaba and Mkhulu Zwane. I am you; you are all a part of me, and we are all a part of this achievement. All my love.

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"*For every mountain, you brought me over. For every trial, you've seen me through. For every blessing, hallelujah. For this, I give you praise*." Kurt Carr, 1998.

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ABSTRACT

Students in Open Distance Learning (ODL) face a myriad of challenges including a low proficiency in English. While research has identified vocabulary as important in improving language proficiency and the pertinent role of interaction in vocabulary development, there remains a dearth of research on how to enhance vocabulary in ODL, a context which is characterised by the distance between students and the institution. In searching for an intervention that would support vocabulary development, including interaction, while taking cognisance of the distance between students and lecturers, this study explored the use of mobile learning (mlearning). Because mlearning technologies offer ubiquitous flexibility and accessibility, they were deemed fit for purpose for ODL which is established on the principles of openness, flexibility and student-centredness.

Using the design-based research (DBR) method within a pragmatic paradigm, this study designed, implemented and evaluated mobile-based interventions for vocabulary development. The first phase of the study involved the analysis of the problem through a literature review. The literature and theoretical framework were used to ground the second phase of DBR, which included the development of the intervention prototype in the form of a mobile-based vocabulary development app called VocUp. The intervention was implemented, tested and refined in three iteration stages, which formed the third phase of DBR. The iterations included a VocUp only stage, followed by a WhatsApp only stage, and ended with a VocUp plus WhatsApp stage. The last phase of DBR involved a reflection and a production of artefacts and guidelines for practice in ODL.

Data were collected through interviews and WhatsApp chats from students registered for a first-year English module. The results were 1) that vocabulary should be explicitly taught, allow for rehearsal opportunities and contain assessment while acknowledging the instrumental role of interaction; 2) mobile interventions should balance the pedagogic benefits with the technological qualities; and 3) the advantages and challenges of using WhatsApp and VocUp can be successfully combined into a hybrid model of both platforms. This study's contribution to the body to knowledge includes the newly-designed VocUp as an artefact; a revised model of the CoI theoretical framework called MODeL as well as principles guiding the application of the MODeL in authentic ODL contexts.

KEY TERMS: Android apps; Design-Based Research (DBR); cellphones; Community of Inquiry (CoI); interaction; mobile app development; mobile apps; mobile learning; multi-componential word knowledge; student support; vocabulary; WhatsApp

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ACRONYMS

AWL	Academic Word List
CD-ROM	Compact Disc Read-Only Memory
CoI	Community of Inquiry
DBR	Design-Based Research
DBRC	Design-Based Research Collective
DE	Distance Education
DVD	Digital Versatile Disc (formerly known as Digital Video Disc)
EFL	English as a Foreign Language
ICT	Information and Communication Technologies
IM	Instant Message
L1	First Language
LMS	Learning Management System
MALL	Mobile Assisted Language Learning
MCQ	Multiple Choice Question
Mlearning	Mobile Learning
ODL	Open Distance Learning
OER	Open Educational Resources
PanSALB	Pan South African Language Board
PDA	Personal Digital Assistant
QR Code	Quick Response Code
SMS	Short Message Service
TA	Thematic Analysis
TBLT	Task-Based Language Teaching
Unisa	University of South Africa
USSD	Unstructured Supplementary Service Data
VLT	Vocabulary Levels Test

CHAPTER 1: INTRODUCTION

1.1 Introduction

This chapter sets the scene for the whole study wherein it presents the background and context of the study. Thereafter, the problem and rationale for this study are discussed. In addition, the aim of the study, along with objectives and research questions, is also presented, leading to the methodology employed to respond to the aim. Finally, the key concepts are defined and the Chapter concludes with an outline of the thesis chapters.

1.2 Background and Context

1.2.1 Vocabulary

The mastery of vocabulary, whether in the first, second or foreign language, determines the speaker's ability to function in that language. Vocabulary is not only the core of proficiency in a language; it is also a demonstration of such proficiency. For language learners, specifically, vocabulary is important not only for communication, but also for successfully accessing, comprehending and completing their studies (Politzer, 1978). Zimmerman (1997) concurs by emphasising the centrality of vocabulary to language learning. While students, teachers, materials developers and researchers generally concede that mastering vocabulary plays a crucial role in becoming proficient in a language (Schmitt, 2008), the fundamental question remains on how to develop vocabulary.

A response to the question of how vocabulary is taught and learnt does not have a simple all-encompassing answer because many factors are at play (De Groot, 2006). Firstly, there is some disagreement on whether to purposefully and explicitly teach vocabulary (Feldman & Kinsella, 2005) or let vocabulary be picked up incidentally when learners are exposed to other activities such as reading (Ender, 2014; Tajeddin & Daraee, 2013). The second issue relates to what it is that should be taught or learnt, in the light of the thousands of words in the English language (Nation & Waring, 1997). In the past, vocabulary teaching and learning were relegated to being secondary to such language aspects as reading and focus on grammar. These days, however, vocabulary is being viewed as a core component of language proficiency (Cahyono & Widiati, 2008). Vocabulary is learnt and enhanced through interaction, which is vital for success in education. Interaction is even more critical in Open Distance Learning (ODL) contexts where learning is characterised by physical as well as pedagogical separation between students and lecturers (Moore, 1993).

In ODL, the students face many barriers including lack of English proficiency, and they display poor writing skills (Geduld, 2013). If, therefore, vocabulary development leads to language proficiency (Milton, 2013), it follows that the students in ODL need to improve their vocabulary in order that they can enhance their academic performance. Unfortunately, the feasibility of interaction in its varied forms is onerous in the unpropitious conditions, owing to the physical as well as pedagogic distance between students and learning environment. Mobile learning, therefore, offers a space that makes interaction and attention to vocabulary possible.

This interaction is facilitated and augmented by mobile learning (hereafter mlearning) technologies which are flexible, available and cater for a myriad of interaction activities (Traxler, 2009). Therefore, mlearning technologies are ideal in this context. It is therefore important to investigate how the affordances of mobile technologies can be harnessed to teach vocabulary in ODL.

1.2.2 Mobile learning

The appeal of the modern cellphone is that it is a mini computer where one can make calls; surf the internet; access resources; read books; connect with others using the social media; take pictures and videos; view pictures and videos; and create, access, share and distribute information from one handy device (Godwin-Jones, 2011). Godwin-Jones further states that a person can engage in all these activities anytime and anywhere, because cellphones are conveniently accessible. With all the benefits of a mobile super-device, it is inevitable that one begins to speculate how such advantages could be harnessed for enhancing language learning since they bring the benefit of time and location flexibility (Caudill, 2007) together with the many activities that are possible in one device. The idea of a student being able to access and interact with learning is shared by Petrova (2004) who adds that a student can learn during work breaks, while travelling or even at midnight. The freedom to access learning anywhere and anytime is realised through mlearning (Georgiev, Georgieva, & Trajkovski, 2006) where students can study even while they travel on the bus or while relaxing in a park. Cellphones have transcended the function of making and receiving calls and they are now a learning tool, nourishing learning practices in emerging “communities of practice” in which “learning is a social activity” (Velghe, 2013).

Research has shown the benefits of mlearning for language development to demonstrate that it is more than the latest learning fad and that it offers more than a cosmetic benefit of being seen and perceived as techno savvy (Lee & Chan, 2007). In fact, Hyman, Moser and Segala (2014) stated that mobile information technology is changing the education landscape by offering learners opportunities for different types of instruction and interaction. While researchers have written extensively on how e-learning and mlearning technologies impact learning in contact contexts (Ellis, 2003; Karakas, 2011; Poleon & Krishnan, 2013; Qingyang, 2004; Sandberg, Maris & de Geus, 2011), there remains a paucity of research on how mlearning can improve language learning in ODL contexts.

Context plays a major role in any teaching and learning endeavour. An example of how contextual requirements could be acknowledged was presented by Ford and Leinonen (2009) who used SMS and text-to-speech technologies to enable students to access information using voice through audio Wikipedia. Participants sent SMS messages to search for a term, the server called the user and the system would read the article found in Wikipedia. Participants then shared the information with their peers through audio files using any of the 11 official languages of South Africa. The South African context demanded a learning environment that would cater for a variety of languages, and the mobile phone made that possible.

1.2.3 Open Distance Learning and the University of South Africa

According to Heydenrych and Prinsloo (2010), distance education "has evolved over centuries and its one distinctive characteristic was, and still is, the physical separation between the delivering institution and its students" (2012: 6). The separation between learning institution and student has underscored the many changes in distance education, as stakeholders are continually looking for ways to mitigate the distance associated with this form of education. Research shows a general development of distance learning from print-based mass production to more technology enhanced delivery (Garrison, 1985; Guglielmo, 1998; Lauzon & Moore, 1989; Moore & Kearsely, 2005; Taylor, 2001). The ODL model of education is built on openness in distance education. ODL, according to Pityana (2004), enables an expansion of tertiary enrolments at less cost per student than at the conventional residential campus system. At his inaugural lecture as the Chancellor of the University of South Africa, Mbeki (2017) stated "higher education provides opportunities for

social mobility" and that higher education "is increasingly important for opening up people's opportunities." While higher education in general is viewed as facilitating social mobility and opening opportunities, ODL in particular widens the opportunities to tackle the problem of exclusion. In other words, ODL opens access for those who would otherwise be excluded from tertiary education on the grounds of financial, time or geographical constraints. The attraction of ODL institutions, therefore, is their inherent or supposed ability to open up possibilities for those who could have been left behind. This is why most ODL institutions market themselves to prospective students as open and accessible (Letseka & Pitsoe, 2014).

As an ODL institution, Unisa is the "largest open distance learning institution in Africa and the longest standing dedicated distance education university in the world" (Unisa, 2017). With over 140 years as a teaching and learning institution, Unisa currently has an enrolment of over 300 000 students (Unisa, 2017). Unisa's student profile is a heterogeneous mix of races, genders, continents and backgrounds. Like other distance education institutions, Unisa has experienced the five DE generations: it has been through correspondence by mail; has used audio and video cassettes as part of the study packages; uses e-learning in the form of MyUnisa, a Learning Management System (LMS) towards embracing developments in technology; is exploring the use of the Internet in teaching and learning, including Open Education Resources (OERs), and finally, Unisa is exploring the use of mobile technologies for student support strategies.

Unisa has taken strides in embracing technologies towards academic, administrative and other student support initiatives, but these have mainly pertained to e-learning. The LMS, for example, is used for course administration such as announcements and submitting assignments, as well as pedagogy where teaching and learning take place. While mlearning is acknowledged in the Unisa ODL policy as having potential, it has not penetrated much into the teaching and learning activities of *Unisans* (the Unisa community). Mlearning is used at Unisa in administration, the library and some teaching and learning initiatives. When students apply for study at Unisa, for example, they receive an SMS acknowledging the application. SMSes are used to send messages to the prospective student with updates on the application process. When students are accepted and they have to register, their journey through registrations is facilitated through SMSes with announcements on the status of the registration.

Assessment is also facilitated through SMSes where announcements regarding assignment due dates and examination timetables are sent to students. Unisa also recently launched a mobile app for submitting Multiple Choice Question (MCQ) assignments. When students log into the mobile assignment submission app, they can submit MCQ assignments by clicking on the correct options – course code, assignment number and semester number – on their cellphones. The app also gives students access to the memorandum for assignments after the due date for an assignment has passed. Announcements on crucial information regarding the institution are also sent to students and staff through SMSes. An example is that of the volatile time when there were protests at Universities, which necessitated an accessible, flexible, fast and cost-effective mechanism of alerting staff and students as regards their safety and similar warnings.

The Unisa library also uses a mobile version of the library's catalogue system called *m-oasis* with the tagline, "The Library in the palm of your hand". According to the Library site, the *m-oasis* allows students to access the Unisa library resources using their cellphones easily in the same way as they would at the actual library. For a distant student, activities such searching the library catalogue; requesting materials and contacting the library are now more convenient and faster. Unisa, thus far, has also taken steps towards helping students acquire mobile devices as well as data at discounted rates. The agreement with data service providers as well as suppliers ensures that students can purchase tablets and data at a minimal price and with options for monthly payments.

While mobile phones have been used mainly for administrative purposes at Unisa, some lecturers have ventured into incorporating the use of mobile devices in teaching and learning. In a publication that celebrated teaching and learning at UNISA, a number of teaching teams were featured to showcase how e-learning and mlearning could be integrated in teaching and learning (Unisa Department of Corporate Communication and Marketing, 2011). Of the 13 featured teams, only one illustrated the use of mlearning, while others showcased the use of e-learning through the tools on MyUnisa. The lecturer who used mlearning sent SMSes to her students every Monday. The SMSes contained motivational, administrative and course content messages. Her students enjoyed the convenience and cost-effectiveness of using their cellphones to interact with their peers as well as their lecturer. The feedback from students was so positive that she proceeded to

explore using social media platforms such as Mxit. At Unisa, therefore, there are some notable areas where the benefits of cellphones augment the distance as illustrated in Table 1.1 below.

Table 1.1: The prevalence of mlearning at Unisa

Mlearning prevalence at UNISA	Examples	Mlearning in practice
Institutional policies	The Curriculum Policy of 2012 under 5.7.2 - pedagogy and technology	Embedding e-learning and mlearning in teaching and learning
Library	Library catalogue named m-oasis	Access to library resources such as searching the library catalogue; requesting materials and contacting librarians
Provisions	Agreements with computer companies as well as data service providers for discounted rates	- Students can purchase bulk data at discounted prices - Students can purchase tablets at discounted prices
Teaching and learning	Lecturers report mlearning for teaching	SMSes containing definitions of the central concepts sent to students
Administration	Registrations	Applications acknowledgement and updates through SMS
	Assessment administration	- Updates on status of assignment (received, marked, returned) through SMS - Examination and portfolio announcements through SMS - Mobile app for submitting Multiple Choice Question (MCQ) assignments.
	Governance	National Student Representative Council (SRC) elections conducted through USSD codes.
	Announcements and information dissemination through SMS	- Announcements of meetings and resources - Management of ephemeral closures of University entrances

Source: Shandu, 2017

The above table illustrates a somewhat skewed representation of cellphone use with a concentration on administrative matters. The table portrays minimal learning associated with mlearning, while Mobile Administration exists in different forms: mAnnouncements; mVoting and mRegistration. There is a marked absence, however, of demonstrating the use of mobile phones for teaching and learning as well as facilitation of interaction between

students, lecturers and course content (Owen, 1993). Because mobile technologies have demonstrated potential to make learning even more widely available and accessible (Brown, 2003), there is an evident need to explore how these mobile technologies can facilitate interaction towards vocabulary learning in ODL.

1.3 The problem

Vocabulary is intricately linked to a learner's proficiency and ability to function in a language (Ellis, 1997), but the problem arises when vocabulary is to be taught and learnt at a distance. At Unisa, a student's proficiency in English determines their academic success since English is the language of teaching and learning. Such an important role of English presents a challenge for those students whose proficiency in English is low owing to English not being their mother tongue. At Unisa, the proportion of African students was 70% of the 328 864 students who were registered in 2011, based on audited statistics by Unisa's Department of Institutional Statistics and Analysis. These students have English as a second language and struggle to meet the academic demands because of the language barrier. Research has proven the immense benefits of increased vocabulary for academic success. One such argument is that "academic success depends on reading ability, and reading ability is in turn strongly linked to vocabulary" (Folse, 2010: 140). The link between increased vocabulary and increased academic performance presents the first problem in this study related to the amount of vocabulary to be taught.

This problem occurs in the light of research that proves that an educated native speaker of English knows about 20,000 word families, or 70,000 words (Nation, 2001), but learners of English know only a fraction of this number (Laufer & Yano, 2001). The second problem that is linked to improving vocabulary is how to teach it because even though teachers recognise their learners' vocabulary inadequacies (Knight, 1994); many feel uncertain about how it can best be incorporated into their teaching plans (Read, 2004). Teachers do not know how to teach vocabulary since "Vocabulary is not explicitly taught in many second language (L2) classes, and students are usually expected to learn vocabulary on their own without much guidance. In those instances when vocabulary is taught in L2 classes, it is often taught poorly or unsystematically…merely giving students lists of words to learn is certainly not effective vocabulary instruction." (Oxford & Scarcella, 1994: 231).

The third aspect of the problem is presented by the context of this study, which further compounds the problem. In ODL, where this study is based, there is a marked distance between the students and lecturers. It seems, thus, that vocabulary teaching and learning in ODL is a formidable task especially since interaction plays a crucial role in vocabulary learning specifically and language learning in general (Oxford & Scarcela, 1994). Finding effective strategies of enhancing the vocabulary of university students amidst the spatial, temporal and pedagogic distance is, therefore, a problem in ODL. This study was an attempt to address this multi-faceted problem by using the ubiquity and accessibility of mobile phones to implement a vocabulary intervention. In short, the idea was to harness the affordances of mobile technologies, which are part of the students' lifestyle, by presenting a portable programme of learning that is accessible to students anytime and anywhere.

The problem addressed in this study, thus, was that there was scanty research on how to harness the benefits of mlearning for supporting vocabulary teaching and learning in ODL contexts, in light of the uniqueness of the ODL context as well as the unique nature of the student profile. In other words, there was a lack of "mobile learning models or frameworks that factor in the needs of developing countries in mobile learning." (Hsu & Ching, 2015: 14). The rationale for this study, consequently, was that while literature affirmed vocabulary development as fundamental to academic success and interaction as vital for such development, there was a need for guidance for vocabulary teaching and learning in ODL through mlearning technologies. It is against this background, therefore, that it is imperative to emphasise that it is not the aim of this thesis research to generate evidence for a link between vocabulary learning and improvement of students' academic performance. This thesis focuses on providing guidelines for using mlearning as a support mechanism for vocabulary teaching and learning, specifically in ODL.

1.4 Research aim

Focusing on first-year students at Unisa, an ODL institution, the aim of this study, was therefore, to investigate ways of supporting vocabulary teaching and learning through newly-developed and existing mobile applications. In order to realise the stated aim, the following sub-aims were set:

1 To examine the principles guiding vocabulary teaching and learning in relation to ODL.

2 To design a mobile application aimed at supporting English vocabulary teaching and learning.

3 To examine how students engage with newly developed and existing mobile applications.

3.1 To examine how vocabulary learning is enhanced through a newly designed vocabulary app – VocUp.

3.2 To examine how vocabulary learning is enhanced through an existing app – WhatsApp.

3.3 To examine how vocabulary learning is enhanced through a hybrid mobile learning model – WhatsApp and VocUp.

4 To develop a framework for mobile-based teaching and learning in ODL.

1.5 Research questions

Focusing on first-year students at Unisa, the main research question was: How can vocabulary teaching and learning be supported through mobile applications in ODL?

The sub-questions guiding this study were:

1. What are some of the principles foregrounding vocabulary teaching and learning?
2. What are the steps to designing a mobile-based vocabulary teaching and learning intervention that is suitable for an ODL context?
3. How do students respond to the use of mobile-based applications?
   3.1 How is vocabulary learning enhanced through a newly designed vocabulary app – VocUp?
   3.2 How is vocabulary learning enhanced through an existing app – WhatsApp?
   3.3 How is vocabulary learning enhanced through a hybrid mobile learning model – WhatsApp and VocUp?
4. What guidelines can be established as a framework for supporting vocabulary teaching and learning through mobile technologies in ODL?

1.6 Methodology

Since the aim of this study was to investigate ways of supporting vocabulary teaching and learning through newly-developed and existing mobile applications, there was a need for a methodology that would incorporate the development and testing of vocabulary interventions. To address the research aim, therefore, the study used Design-Based Research (DBR) as a methodology.

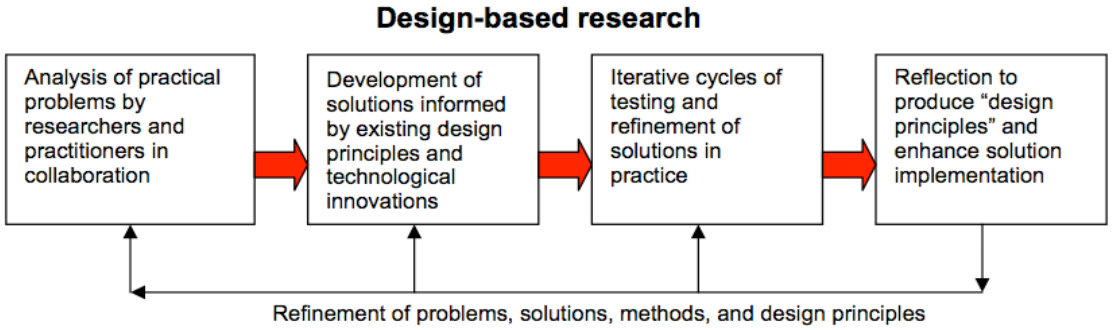
While the reasons for using DBR will be expounded in the methodology chapter, it should be noted here that DBR was chosen because of its devotion to the development of interventions that solve problems in authentic contexts. Since a new mobile app was developed and used, in conjunction with WhatsApp, to enhance vocabulary, the object of inquiry was the use of mobile-based vocabulary interventions in ODL. It should be emphasised that "research in mobile learning starts with an educational goal and not with technology as the goal" (Ng'ambi, 2013: 659). The thrust in this study was educational in that it was motivated by the desire to help students improve their vocabulary while the mobile technologies provided a platform that enabled vocabulary-learning activities.

To avoid using the mlearning space for a haphazard presentation of vocabulary to be learned, the study used Nation's (2001) multi-componential framework that refers to the three dimensions of word knowledge, including form, meaning and use, to teach vocabulary systematically using mlearning. It should be emphasised, thus, that DBR is concerned with addressing complex problems in real contexts in collaboration with practitioners; integrating known and hypothetical design principles with technological affordances towards practical solutions (Brown, 1992; Collins, 1992); conducting rigorous and reflective inquiry to test and refine innovative learning environments as well as to define new design principles (Kolmos, 2015). In short, DBR weaves the actions of research and practice together (Wulff & George, 2016).

Because DBR "pragmatically employs qualitative and/or quantitative research methods that are congruent with the research questions" (MacDonald, 2002: 430), this study used a combination of qualitative methods in the form of virtual semi-structured individual interviews as well as WhatsApp chat logs in order to respond to the research questions. The combination of data collection strategies allowed for a more robust understanding of the learning environment (Bannan-Ritland, 2003; Brown, 1992; Design-Based Research Collective (DBRC), 2003; Wang & Hannafin, 2005). In attempting to understand how vocabulary is and can be taught using mlearning environments, this study relied on three iterations of the implementation of the intervention where vocabulary was taught and learnt through 1) VocUp, 2) WhatsApp and then 3) VocUp and WhatsApp combined. These iterative cycles of design, implementation and evaluation led to the production of artefacts, revised theories as well as guidelines for vocabulary learning and mlearning in ODL.

In this study, the four-phased DBR was used which comprises the identification of a practical problem; the development of a solution; testing and refinement of the solution and finally, reflection.

Figure 1.1: Model of Design-Based Research



Source: Amiel and Reeves (2008)

As depicted in the above table, the first phase of the DBR is composed of the identification and analysis of a practical problem (Amiel & Reeves, 2008) through a collaboration of researchers and practitioners and/ or the literature review (Reeves, 2006). Because sometimes it is not feasible for a doctoral study to factor in collaboration (Kennedy-Clark, 2013), the first phase of DBR in this study relied on the literature review to identify and analyse the problem. The second phase in the DBR involves the development of a solution using existing principles. It was at this stage in this study that the intervention was designed and developed using guidelines for vocabulary learning; technological qualities in mlearning as well as ODL principles. During the second phase, the intervention is developed as a prototype, which will be tested and refined in the third stage (Amiel & Reeves, 2008).

The third stage of the DBR is preoccupied with evaluation and testing of the solution in practice (Reeves, 2006). It is crucial to note the importance of testing the intervention in authentic contexts of practice (McKenney & Reeves, 2013) because DBR is concerned with improved interventions and principles for real educational environments. In this study, the third phase included a series of iterative cycles (DBRC, 2003) of the intervention. The testing and refinement iterations led to the fourth stage of DBR in the form of a reflection to produce design principles and enhance solution implementation. In this study, this phase portrayed the knowledge and intervention nature of DBR (McKenney & Reeves, 2013) in that the reflection involved producing both the refined artefact as the intervention and the guiding principles for practice as refined knowledge (Andersen & Shattuck, 2012).

1.7 Rationale

The successes and effectiveness of mobile phones for language development have been extensively researched (Hayati, Jalilifar & Mashhadi, 2013; Stockwell, 2010; Thornton & Houser, 2001, 2004, 2005). While most research has been conducted on the use of the Short Message Service (SMS), Wu (2015) concluded that using a vocabulary app was also effective for learning hundreds of new English words. Having taught English to high school teenagers to adult students and from first-year to postgraduate university students, I have noted how English language proficiency impacts on academic performance. Research has also repeatedly proven that increased vocabulary positively influences academic performance (Wilkins, 1972; Nation & Waring, 1997). The decision to use mobile phones for teaching vocabulary was influenced by three factors: context, availability and accessibility. The context was a central determiner for the use of cellphones because, in an ODL context, there is a spatial, temporal and cognitive distance among students, lecturers and institutional resources. There was a need for a delivery that would not be limited by time and space.

Secondly, it would have been futile to exert time and energy on content that would be delivered in a mode that was not available to those who stood to benefit from it. Keegan (2005:3) stated, "It is not technologies with inherent pedagogical capabilities that are successful in distance education, but technologies that are generally available to citizens". Cellphones were chosen because of their extensive ownership. In South Africa, for example, there was a population of about 49 million in 2015, with a cellphone ownership of just above 85 million; with less than a percentage of users relying on fixed broadband, while 29% used mobile broadband (International Telecommunication Union, 2016).

Thirdly, the vocabulary lessons had to be accessible whether students were at work, in the mall, travelling or wherever they would be because ODL students study whenever they have an opportunity. The delivery mode for the intervention had to be flexible without being tethered to a particular spot since that would have constrained access. The intervention had to be, literally, with the students all the time. Coincidentally, in isiZulu (one of the more widely spoken official languages in South Africa), a cellphone is called *Umakhal' ekhikhini* (directly translated to mean *It cries in your pocket*).

Practitioners in ODL continually explore various strategies for enhancing their students' language proficiency, among other forms of student support. The rationale for this study,

therefore, is the use of mobile devices through mlearning where, as a practitioner, I wanted to take advantage of the ubiquity and wide ownership of mobile phones for student support.

1.8 Research ethics

This study received approval from the College of Human Sciences' Research Ethics Review Committee (Ethical Clearance: Appendix 2). Although studies in second language acquisition "do not pose a substantial risk of harm" (Thomas & Pettitt, 2016: 273), it was crucial in this study to adhere to ethical practices in all the stages of the study including the invitation of participants; administration of the intervention, storage of data as well as reporting the research, in order to ensure that the participants were not at risk of harm. From the onset and throughout the study, information was communicated clearly and in a straightforward manner so that the participants would understand their role in participating in this study.

Informed Consent

When participants were invited, they were given an invitation to participate in the study, which included an Informed Consent Form (Appendix 1). The Informed Consent Form included information on what the study is about and what participation in the study would entail. The Form also assured prospective participants of their anonymity as well as the right to cease participating in the study at their discretion without fear of prejudice or negative consequence. Informed consent is a "cornerstone of the ethics of scientific research" (Thomas & Pettitt, 2016: 271) because it is an indication that the participants understand their involvement in the study. Participants have a legal right to knowing what it is they are getting involved in (Pring, 2005). The primary concern for ethical issues in this study came with the use of WhatsApp since the participants' cell numbers were available to the five members who formed part of each WhatsApp group. Risks such as associated with unsolicited messages and bullying are a reality for mobile learning research (Winshart, 2009), but the orientation before this study began ensured that the participants understood that the WhatsApp groups were to be used only for research purposes. It was also emphasised that no one was allowed to use the cellphone numbers of other participants for any other reason. Finally, the researcher reiterated that participants could communicate any feelings of unease and leave the study if they felt perturbed in any way and at any time.

1.9 Definition of terms

Because of the many definitions associated with the key concepts in this study, it is crucial that working definitions of the key terms be introduced in this section.

Vocabulary

In this study, vocabulary refers to English words in their multifaceted nature. The definition of vocabulary in this study is based on Nation's (2001) multi-componential word knowledge, what he terms aspects of knowing a word, which are form, meaning and use. For the purposes of this study, not all the hundreds of thousands of words contained in the English language were used (Oxford Advanced Learner's Dictionary, 2016), because in vocabulary teaching, "only a few words and a small part of what is required to know a word can be dealt with at any one time" (Nation, 2005: 47). The intervention in this study is open for additions of as many words as needed, but for the benefit of the study, the vocabulary focuses on the words covered in the 10 000 word levels of the two versions of the Vocabulary Levels Test (Schmitt, Schmitt & Clapham, 2001). Although the test was developed by Nation earlier (1990; 1983), the latest version was used because it has been revised and validated through research.

Mlearning

Because the intervention in this study is mobile-based, it is important to define mlearning as pertaining to this study. At a superficial level, mlearning can be taken to mean any situation where a learner uses any mobile source for learning, a device they could carry around. In this case, a book would qualify as a mobile device as suggested by some researchers (Harris, 2001). Mlearning, however is more than using learning material that can be carried around because it highlights technological advances as well as learning. More than a decade ago, mlearning was defined as "any educational provision where the sole or dominant technologies are handheld or palmtop devices" (Traxler, 2005: 262). This definition was technocentric and did not incorporate other aspects of mlearning. In this study, therefore, the definition of mlearning takes into consideration the mobility of the learner, the technology as well as learning itself (Brown, Börner, Sharpless, Glahn, De Jong & Specht, 2010). Mlearning in this study also captures the technology advances afforded by the delivery mode (Sariola, 2002). A definition that encompasses these crucial elements is

provided by Crompton who defined mlearning as “learning across multiple contexts, through social and content interactions, using personal electronic devices” (2015: 4).

Mobile Assisted Language Learning (MALL)

As a branch of mlearning, Mobile Assisted Language Learning (MALL) “affords exposure to authentic language samples and challenges in location-specific communicative situations and provides supports required for such situated learning” (Palalas, 2012: 26). In short, MALL can be viewed as mlearning specifically for language learning. It might be debatable, therefore, if this study should not be emphatically labelled as MALL since it explores the teaching of language aspects. It is argued that this study deliberately elected to use an mlearning association based on the infantile state of the use of mobile devices for learning in ODL, particularly at Unisa. Using mobile devices for learning spreads beyond language and the principles found in this study transcend the borders of language, therefore, this study adopts the concept of mlearning.

Open Distance Learning (ODL)

This study uses the definition provided by Unisa where ODL is defined as a “learning model that endeavours to bridge the time, geographical, economic, social, educational and communication distance between the institution and the students, the academics and the students, the learning materials and the students and amongst the students themselves.” Unisa (2008).

Design-Based Research (DBR)

DBR has been defined as “a series of approaches, with the intent of producing new theories, artifacts, and practices that account for and potentially impact learning and teaching in naturalistic settings” (Barab & Squire, 2004: 2). Because DBR, as a methodology, is “important for understanding how, when, and why educational innovations work in practice” (DBRC, 2003: 5), in this study it was used for insight into how mobile-based vocabulary interventions are implemented and what makes them work in ODL. While the definitions and discussion on DBR are presented in detail in the Methodology section, the working definition in this study is provided by Wang and Hannafin who define DBR as “a systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among

researchers and practitioners in real-world settings, and leading to contextually-sensitive design principles and theories" (2005: 6).

1.10 Outline of thesis

Chapter 1 presented the background to the study. The initial chapter also introduced the problem statement, the aims of the study as well as the research objectives. The methodology used in the study was also introduced.

Chapter 2 delves into the key concepts in this study including vocabulary, mlearning and ODL through a literature review. The chapter further maps out the changing landscape of teaching and learning in ODL, focusing on studies on mlearning.

Chapter 3 provides details on the theoretical framework of this study. After tabling other frameworks which were considered, the chapter will focus on the main theories that relate to language learning and teaching.

Chapter 4 presents the steps to developing VocUp, the mobile app which forms part of the vocabulary intervention. The chapter details the steps of conceptualisation, planning, design, implementation and evaluation.

Chapter 5 focuses on methodology. The chapter begins by discussing the research paradigm and the review of methodologies that were considered for this study. Design-Based Research as a method is then presented in detail, including its justification. The final section includes details on data collection and analyses within the three iterative cycles of the vocabulary intervention.

Chapter 6 furnishes the findings and discussion of summative evaluation. The discussion is presented in relation to the research questions. Faithful to the precepts of DBR, the conclusion shows the artefact with the contributions to theory as well as principles guiding practice.

Chapter 7 constitutes a conclusion and reflection on the study as a whole, from the introduction to methodology to DBR being used to refine guidelines for developing a model for a mobile-based language development programme. After presenting the implications of the study, the chapter offers recommendations for further research as well as final reflections.

CHAPTER 2: LITERATURE REVIEW

2.1. Introduction

This Chapter maps out the landscape of vocabulary teaching and learning in ODL, including studies on mobile learning. A review of past, present and the future of ODL is also presented, proceeding through the distance learning generations, from paper-based correspondence to electronic learning as well as mobile learning. Studies on mobile-enhanced teaching and learning are also discussed as Hofstee (2006) states that a researcher needs to select and review published works that are relevant to the researcher's study. For DBR, which is the methodology in this study, the literature review serves to (a) help flesh out what is already known about the problem and (b) guide the development of potential solutions (Herrington, McKenney, Reeves & Oliver, 2007). In this chapter, therefore, previous studies linked to using technology in general, and mobile technology in particular, in educational settings, are reviewed. An exploration of previous studies will also assist in identifying the status quo in literature and establish the platform from which more research in the area of using mlearning for language development could be launched. While this chapter serves mainly as a theoretical background, largely to the key concepts of this study, it also presents previous studies related to this one and positions the latter in the "context of the general body of scientific knowledge" (Babbie & Mouton, 2001: 565).

2.2 The literature review

2.2.1 Vocabulary teaching and learning

Vocabulary is a fundamental component of the language that we use. According to Zimmerman, "vocabulary is central to language and of critical importance to the typical language learner" (1997: 5). The lexicon is essential in communication and there is evidence that students also believe that, of all the error types, vocabulary errors are the most serious (Politzer, 1978). Vocabulary, therefore, can make or break a communication process as much as it can hinder or facilitate academic success. Not only are there serious errors related to lack of vocabulary in academic performance, but according to Nation and Waring (1997: 238) there are also about 2000 high-frequency English words, without which it is impossible to use English in a "normal way". Furthermore, there are 800 academic words, which students need for academic study in any field and for reading newspapers with comprehension. Coxhead (2000) further updated these academic words in the Academic Word List (AWL)

(2000). It is clear, thus, that being able to function normally in a language in general, and academic study specifically, is supported by well-developed vocabulary. So important is vocabulary that Krashen and Terrell (1983: 155) stated, “language acquisition will not even take place without comprehension of vocabulary”.

While vocabulary is critical both in communication and in language learning (Gu & Johnson, 1996; Hosoda, Tanaka, Nariai, Honda & Hanakawa, 2013; Nation, 2001; Nation, 2006), there has been a conspicuous exiguity of research with an explicit focus on vocabulary. Gass expatiated on the concept of the discrepancy between the importance of vocabulary and limited research with a focus on vocabulary by stating, “…despite the obvious role of the lexicon, it has had a unique place in second language research. Its uniqueness can best be characterised by lack of focus.” (1988: 93). This view was shared by Meara (1980), Morgan and Rinvolucri (1986), Oxford and Scarcella (1994) and Zimmerman (1997). The aforementioned assertion does not imply that there does not exist research in vocabulary, but Carter and McCarthy (2013) state that although there has been some growth in the interest of research in vocabulary in the past 25 years, the evidence of that interest is scarce. This is odd, considering that as far back as the 1970s, Wilkins pithily stated, “Without grammar very little can be conveyed, without vocabulary nothing can be conveyed” (1972: 111). Thus, it is needful to research and report on studies that focus on explicit vocabulary teaching and learning.

It is not that there is a lack of research in vocabulary development altogether, but vocabulary development has been relegated to something that will be acquired incidentally while teachers and learners focus on other preoccupations of teaching and learning. Owen (1993) presented examples where discussions revolved around either teaching grammar in relation to vocabulary, as they are closely concomitant, or teaching these two separately. Thus far, language teaching has focused primarily on syntax, learning styles, learner motivation, student needs, learner strategies and incidental learning (Folse, 2004). To put it in different words, the myth has existed that somehow vocabulary will be absorbed while learners preoccupy themselves with input.

The debate on how language is learned and by extension, how it should be taught, has continued for decades, largely between implicit and explicit vocabulary teaching. The

proponents of implicit vocabulary teaching and learning purport that learning vocabulary is incidental and takes place while one is engaged in other pedagogical activities (Joe, 1998; Fraser, 1999; Brown, Waring & Donkaewbua, 2008; Ender, 2014). Gass (1988) defined incidental vocabulary learning as a by-product of other cognitive activities that require comprehension. Incidental vocabulary learning is thus implicit. Implicit language learning can be based on the mother tongue acquisition where the primary mode of vocabulary acquisition is incidental, through listening and interacting with those around (Nagy, Herman, McKeown & Curtis, 1987; Sternberg & McKeown, 1987).

While this study acknowledges the merits of implicit vocabulary learning, it recognises the benefits of directly and purposefully teaching vocabulary in the form of explicit vocabulary teaching and learning (Beck, McKeown & Kucan, 2013; Biemiller, 2004; Ellis, 1997; Feldman & Kinsella, 2005; Nation, 2001). Vocabulary teaching, thus, "deals with the selection and presentation of words for learners" (Furneaux, 1999: 367). Paying attention to what must be taught together with how it should be taught is underscored by the importance of systemic and planned vocabulary teaching (Dempster, 1996) where the "intentional and conscious vocabulary study leads to vocabulary growth in second language learning" (Bordag, Kirschenbaum, Rogahn & Tschirner, 2017: 178). Previous studies where implicit and explicit vocabulary teaching and learning have been compared have suggested that intentional vocabulary learning is more effective than incidental acquisition, where explicitly learning new words has resulted in an increased vocabulary and better retention of learned words (Experiment IV in Hulstijn, 1992; Lehmann, 2007; Peters, Hulstijn, Sercu and Lutjeharms, 2009).

Notwithstanding the debate on explicit and implicit vocabulary teaching, there remains a need for vocabulary teaching and learning that is "guided by well-supported principles" (Nation, 2004: 28) because vocabulary is an important part of language and language learning (Schmitt & Schmitt, 1995; Schmitt, 1997). While it could be argued that both implicit and explicit vocabulary teaching can be used together for efficient vocabulary development (Oxford & Scarcella, 1994; Schmitt, 2008; Thornton & Houser, 2001), this particular study foregrounds the explicit teaching of vocabulary while acknowledging that ODL students can, and will, be exposed to contexts where they will incidentally learn vocabulary. In acknowledgement of the minimal control that a researcher in ODL has over what

participants are exposed to in their various contexts, this study focused on the explicitly taught vocabulary. The question is: if students randomly pick up vocabulary as they focus on other cognitive tasks such as reading comprehension, then "how will they understand what they are reading if they have not been taught those words?" (Folse, 2004; 2010). Ellis posited, "…understanding the passage as a whole, and memory for the new word comes as a natural result of this process, a conscious effort to learn being unnecessary" (1994: 219). In other words, it would seem all a learner has to do is focus on grasping the general idea of a text and not on learning specific words. If a reader needs to understand 95% to 98% of words in a text he or she is reading (Nation, 2006), then how will comprehension lead to vocabulary being acquired if those words are not taught? This study, thus, focuses on explicit vocabulary teaching and interaction in digital spaces using mobile learning technologies.

2.2.1.1 The role of vocabulary in language and language learning

Teaching and learning vocabulary seems to be incorporated, sometimes implied, in studies that focus on reading, writing and second language acquisition (Carter & McCarthy, 2013). Reflecting on my language learning history, I do not remember being explicitly taught vocabulary, but its acquisition was presumed in other parts of language learning such as in reading, writing and oral tasks. In my teaching experience, the focus on vocabulary has been minimal. An example is a reading and writing module that I used to teach where we encouraged students to notice certain 'important' words in the form of vocabulary boxes that were pasted next to reading passages. Vocabulary deserves a more prominent feature in language teaching and learning since it is the core of language teaching and learning (Başoğlu & Akdemir, 2010; Carter & McCarthy, 2013). In essence, vocabulary is intricately linked to a learner's proficiency and ability to function in a language (Ellis, 1997). In teaching contexts where students struggle with proficiency in the language that they need to successfully access their learning (Butgereit & Botha, 2009), it is essential that student support initiatives include a focus on vocabulary. Enhanced vocabulary should positively affect language proficiency because vocabulary is the yardstick by which most learners measure language mastery and its difficulty (Carter & McCarthy, 2013). According to this claim, therefore, if students say English is difficult or that they are struggling to understand what they are learning in English, they are most likely indicating they are not able to cope with the vocabulary in English.

For a long time, vocabulary was not given credence or attention in second language teaching and learning (Cahyono & Widiati, 2015). Despite Meara (1980) having noted the importance of vocabulary as far back as the 1980's, there was a dearth of research on vocabulary. This came about because of a focus on grammar at the time as well as a lack of effective models for teaching vocabulary. Recently, however, the prospects of research in this area are changing and in recent years, there has been a steady increase of interest in vocabulary development (Folse, 2010). Newton (2001), for example, investigated this topic by exposing learners to new vocabulary items during reading tasks. The learners had to determine the meaning of the words without the help of the teacher or of using the dictionary to look up the words. The study found that negotiating meaning from context resulted in an increase in examples of language employed by the learners. Moreover, the study discovered that the newly learned vocabulary was retained days after the vocabulary-learning task had been completed.

Another vocabulary study investigated vocabulary teaching in a secondary school in China (Tang & Nesi, 2003). In the study, the researchers reported that vocabulary was taught in planned lessons through multiple treatments, with various kinds of input. The results showed that the learners had grasped the new vocabulary as determined by vocabulary tests. The drawback was that even though the teachers presented exceptional lessons, they provided almost no opportunities for output on the part of the learners.

Another study compared vocabulary teaching using a course book on its own and teaching vocabulary through a combination of strategy awareness and recycling words (Akın & Seferoğlu, 2004). The researchers wanted to see which of the two types of vocabulary teaching resulted in better vocabulary learning and based the comparison on delayed recall. The results indicated that the combination of strategy awareness contributed to students' vocabulary recall of the selected items positively.

A study that presents another debate in vocabulary learning relates to teaching vocabulary in semantic related sets. Erten and Tekin (2008) investigated the effect of two types of vocabulary teaching on vocabulary recall. In the study, a group of learners was taught vocabulary either in semantically related sets or in semantically separate sets. The results of their study revealed that learning words in semantically unrelated sets produced better

results than teaching using semantically related sets. The differences in recall lasted even in delayed posttests. The findings supported the assertion that teaching vocabulary in semantic sets had a ‘‘deleterious effect on learning” (Finkbeiner & Nicol, 2003: 376). It did not help learning, but it did harm vocabulary learning.

The studies above illustrate the varied views concerning what should be focused on in vocabulary teaching and learning, including negotiated meaning and opportunities for output as well as repeated exposure. Studies where vocabulary is implicitly taught focus on the individual learner who will pick up vocabulary as he or she reads or is engaged in other learning activities. Studies on explicitly taught vocabulary tend to focus on the words and the learner, with little information about how vocabulary learning is facilitated through interaction. Vocabulary does not exist in a vacuum, but in use, so interaction should not be precluded from learning vocabulary.

2.2.1.2 Principles of vocabulary teaching and learning

While there is consensus that vocabulary is a crucial part of proficiency and the ability to function in a language, "the best means of achieving good vocabulary learning is still unclear, partly because it depends on a wide variety of factors" (Schmitt, 2008: 329). Researchers such as De Groot (2006) have drawn attention to the lack of agreement on the core principles to vocabulary learning. According to De Groot, the uncertainty is attributed mainly to the wide variety of factors that affect vocabulary learning. Some studies, for example, emphasise the importance of learner motivation in vocabulary learning. Gardner and MacIntyre (1991), in reporting a study on learning vocabulary, assert that both integrative and instrumental motivation influence the rate of second language learning. The seemingly dichotomous nature of instrumental and integrative motivation has been a subject of much debate in Second Language Acquisition (SLA). The consensus is that instrumentality and integrativeness complement each other when a learner pursues individual goals (Dörnyei, 2003; MacIntyre, Baker, Clément, & Conrod, 2001). While this particular study does not focus on motivation, the intervention was designed in a manner that would appeal to the participants. According to Dörnyei (2003), language learners could be in the pre-actional stage – where motivation is generated; the actional stage – where motivation is actively maintained and protected as well as the post-actional stage – where the learner evaluates his or her progress and experiences, noting the strategies that primarily worked in helping to

protect his or her goal. In this study, there was no control over the first stage of motivation; however, the vocabulary intervention took cognisance of the need for activities to appeal to the participants, so their attention and interaction are maintained for successful vocabulary learning (Oxford & Scarcela, 1994).

Other studies, in search of the best way to teach vocabulary, have highlighted the importance of tailoring vocabulary learning programmes to various learner attributes such as their learning styles. Curry (1983) stated that there are as many definitions of the concept of learning styles as there are researchers who have written on the subject. This is what often causes confusion and difficulty when one tries to apply the learning style theory in some contexts. According to Curry (1983: 3), the concept of learning styles refers to a "general area of interest concerning individual differences in cognitive approach and process of learning". While Curry's definition related to a general area of interest, Felder and Henriques (1995) provided a more accurate view of learning styles as diverse ways in which different individuals receive, process and retrieve information. Again, this particular study does not focus on learning styles, but it acknowledges that the use of mlearning technologies provides numerous opportunities for the participants to interact and learn in ways as closely linked to their learning styles as possible, using podcasts, audio and video clips, graphics and designs, pictures and videos and even reading and writing.

With the varied options for areas of focus concerning teaching vocabulary, this study sought guidance in the literature for principles that guide vocabulary teaching and learning. This study, thus, relied on three principles including explicit vocabulary teaching; repeated exposure to vocabulary as well as assessment (Folse, 2010). According to Folse, explicit vocabulary teaching and repeated exposure to the words involves actions from the teacher and the learner. The teacher draws attention to the word being taught “in some way, such as by writing it on the board, using it in an example sentence, repeating it, asking what it means, asking students if they know its meaning, or asking students to use it in an example” (2010: 144). The student, on the other hand, focuses on the word “by looking it up in a dictionary, asking the teacher or another student for its meaning, attempting to use it in an example, or even highlighting it in the book or on the worksheet”. Assessment, Folse stresses, should form part of a vocabulary programme while vocabulary activities should emphasise word use and go “beyond definitions” (2010: 149).

Explicit vocabulary teaching

The first fundamental principle of vocabulary learning is explicit teaching of the lexicon (Nation, 1990). In other words, the teacher needs to provide direct instruction of vocabulary for a particular text. As explained above, vocabulary is necessary for students to understand what they are reading (Anderson & Nagy, 1991). Oxford and Scarcela (1994) contend that it is insufficient for learners to be given lists of vocabulary to memorise on their own without any guidance. Thornton and Houser (2001) presented two support mechanisms, email and mobile phones, to guide their students in learning vocabulary outside the borders of the classroom.

Explicitly teaching form and meaning is, according to Schmitt, “what the vast majority of vocabulary materials and activities attempt to do” (2008: 335). This is also true with the plethora of vocabulary learning mobile apps that are available on various platforms and across languages and proficiency levels; where word form and meaning seem to be the preoccupation of many apps, with a marked neglect of vocabulary use. It does not help if learners spell a word correctly and use it inappropriately in contexts. It was Gee (2014) who stated that "Even if we understand a definition, it only tells us a range of meanings a word has, it does not really tell us how to use the word appropriately in actual contexts of use” (2014: 4). Failure to acknowledge context in vocabulary teaching and use can have precarious consequences. The word for focusing one's eyes on a person or object, for example, could include to ‘look', ‘see', ‘leer', ‘gaze', ‘goggle', ‘eye', and ‘ogle' depending on context. Knowing how a word looks or how it is related to others is, therefore, inadequate since people need words so they are able to function appropriately in different contexts (Stahl & Kapinus, 2001).

Repeated encounters with words

The second principle relates to repeated exposure to vocabulary (Craik & Lockhart, 1972) which, according to Thornton and Houser (2001) leads to deeper mental processing. Ellis (1996) stated that memory functions through short-term and long-term processes. Words stored as short-term representations are quickly forgotten, whereas long-term representations of words are retained longer. Words learned through short-term representation can be maintained as long-term memory through rehearsal or practice,

resulting in acquired vocabulary. In other words, the intervals for learning are not only intended to provide space between the learned words but also to give room for recycled vocabulary; as new words are added, older words are reused as the vocabulary increases.

Ellis found that rehearsal “results in superior performance” in a range of linguistic activities (1996: 243). The notion of multiple exposures to new words in various contexts is supported in literature as a crucial aspect of vocabulary teaching and learning (Henriksen, 1999; Nation, 2001; Schmitt, 1998). The concept of creating opportunities for repeated interaction with vocabulary is evident in Wilkins’ (1974) assertion that a language learner should receive considerable exposure to vocabulary. The exposure should not be mere repetitions, but students should have opportunities to encounter words repeatedly in a variety of contexts (Stahl, 2005).

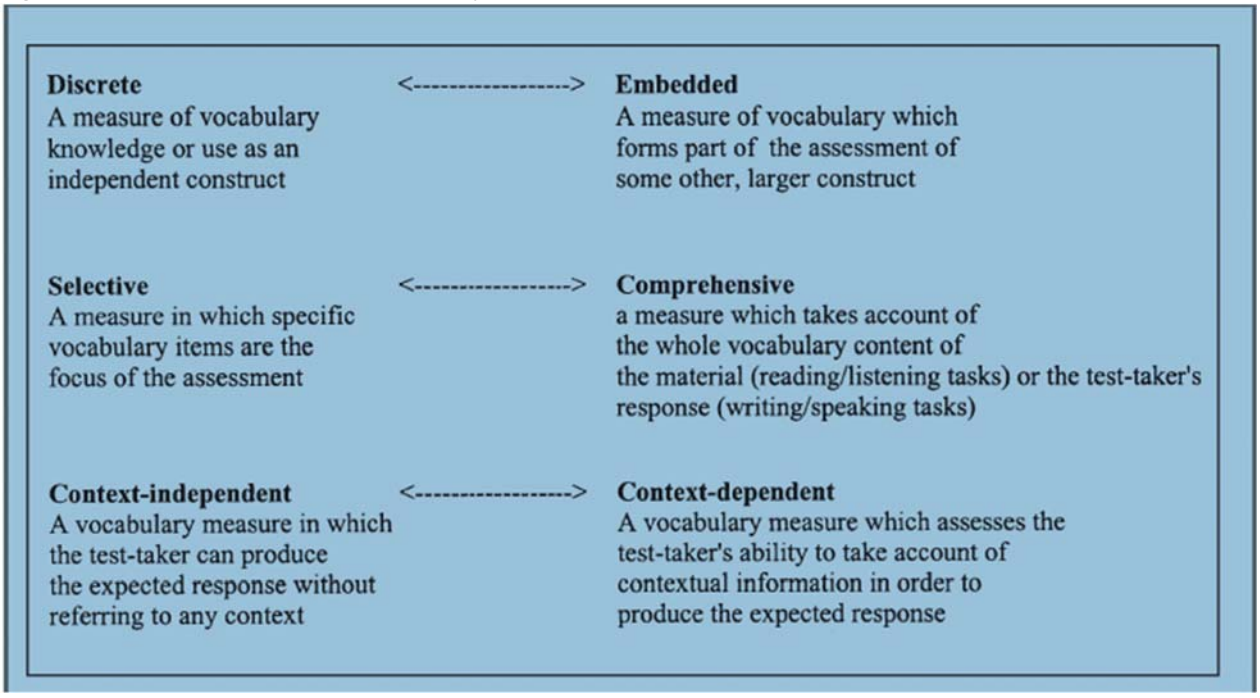
Schmitt has elaborated on the importance of contact with vocabulary by declaring, “The overriding principle for maximizing vocabulary learning is to increase the amount of engagement learners have with lexical items” (2008: 329). While many other strategies could be used to enhance vocabulary, Schmitt argues, "Overall, it seems that virtually anything that leads to more exposure, attention, manipulation, or time spent on lexical items adds to their learning” (2008: 339). Nation sums up the importance of repeated exposure by contending, “The more meetings, the more likely learning is to occur” (2015, 136). It is against this background that vocabulary teaching in this study was designed into the mobile vocabulary app as well as WhatsApp so that the participants and, ultimately, students would have multiple encounters with learnt vocabulary in a variety of contexts.

Assessment

The final principle for vocabulary development in this study relates to assessment (Folse, 2006). Assessment forms an important part of vocabulary learning because testing vocabulary facilities vocabulary retention (Mason & Krashen, 2004). According to Dougherty Stahl and Bravo (2010), assessment plays a crucial role in vocabulary teaching, for the benefit of both the teacher and the learner, in that it determines learners' vocabulary growth and helps to direct vocabulary instruction. The assessment of vocabulary provides more opportunities for repeated encounter with the learned word as well as opportunities for output in the form of rehearsals (Thornton & Houser, 2001). Rehearsals, which include

using the new word in various contexts, are not haphazardly thrown to students, but are spaced to facilitate systematic and planned vocabulary teaching and learning (Dempster, 1996). Because vocabulary learning follows a developmental trajectory (Biemiller, 2004) which, according to Schmitt (2008), is sometimes referred to as incremental learning, recycled words in the assessment ensure that new words are used together with older words through practice. Acknowledging the importance of assessment as a crucial part of teaching and learning leads to the question of how the assessment should be carried out. Read (2000) pointed out that the first step to vocabulary assessment is design. To this extent, Read (2000) put forward a model which can be used to inform assessment design as shown in Figure 2.1.

Figure 2.1: Three dimensions of vocabulary assessment



Source: Read (2000)

According to Read's dimensions, therefore, the Vocabulary Levels Test on which the vocabulary in this study is based is discrete, selective and context independent (Read & Chapelle, 2001). The vocabulary exercises that form part of the intervention, however, are embedded, particular and context dependent in the form of multiple-choice questions and writing sentences and paragraphs.

Based on the above fundamental principles, vocabulary should be explicitly taught in its multi-componential nature while providing opportunities for repeated exposure to the learned words and rehearsals. Assessment, in various forms, is a crucial part of vocabulary teaching and learning. The next section discusses how vocabulary teaching is facilitated through mlearning in ODL, where physical and pedagogic separation prevails.

2.2.1.3 Vocabulary learning using mlearning technologies

The following section considers Mobile Assisted Language Learning (MALL) as a way of illustrating the use of mobile technologies for language learning.

Kukulska-Hulme (2013: 3701) defined MALL as the "use of mobile technologies in language learning, especially in situations where device portability offers specific advantages". From this definition, MALL is not merely a contents delivery mechanism, but provides specific benefits for specific contexts. Simply put, MALL is a specialisation within mlearning, which focuses on use of personal and portable devices in language learning (Duman, Orhon & Gedik, 2014). According to Duman et al., between the years 2000 and 2012 the main categories of MALL context were mobile only; a combination of face to face and mobile; a combination of face to face and distance and mobile as well as a mix of distance and mobile (2014). Their classification is congruent with the classification presented by Chinnery (2006) which includes face to face; distance and online. It is quite relevant in this study that between the years 2000 and 2012, the highest number of published studies were based on mobile only contexts at 55%. The lowest number of published studies were based on distance and mobile settings at 7%.

As an illustration of MALL in a face-to-face plus mobile context, a study by Başoğlu and Akdemir (2010) compared the use of mobile phones to using traditional flash cards to teach vocabulary to undergraduate students at a university in Turkey. Sixty participants took part in the study, which explored the two teaching methods. The 30 participants were assigned to the experimental group, while the rest were assigned to the control group. Using the ECTACO mobile programme, the experimental group was exposed to carefully selected vocabulary, over a period of six weeks. The control group was given the same list of words in flash cards. At the end of the study, qualitative data were collected in the form of semi-structured interviews with randomly selected participants.

The results of the paired samples t-test indicated that the experimental group's vocabulary mean scores had significantly increased from 25% to 39% from the pretest to the posttest. The control group's scores increased from 26% to 35%. The second finding, from interviews, was that it was the mobile phone activities that had helped the control group improve their vocabulary. Finally, the experiences of the two groups were compared, and it was found that the experimental group preferred mlearning because it was easily available, useful and entertaining. While the accessibility and affective appeal of mobile learning are highlighted in this study as well, it is clear that interaction could have been provided for in the contact sessions the students had had in class and was therefore not deemed necessary for the study.

Although dated, the study by Thornton and Houser (2001) has been one of the seminal works in mobile learning. The study focused on University students in Japan who did not have enough time for vocabulary development in class because they met only once a week. Most students were struggling with their language and vocabulary and therefore the study investigated whether mlearning could improve the vocabulary of the participants. In the study, the participants were introduced to five vocabulary items each week – one item per day. Each day of the week, the students were also sent three short lessons of about 100 words, related to the word of the day. The mini lessons included definitions, some aspect of the word and different contexts in which the word could be used. The lessons were linked to a contextualised story and were delivered in informal language. The content was delivered through emails as well as SMS messages. The researchers wanted to examine the usability of the SMS system, the appeal of the stories in the lessons, the sufficiency of the lessons, and ease of access to the intervention. The researchers enlisted eight English as a Foreign Language (EFL) and Japanese as a Foreign Language (JFL) students as participants. Pretests determined sets of words unknown to all students. After developing 15 mini lessons for each week, a computer program was configured to send the lessons to participants at the same time every day.

At the end of the study, posttests were administered to measure the vocabulary learned. The results disclosed that the participants were able to access the lessons; they did read and work on the lessons and found them appealing and enjoyable. A notable finding in this study was that some participants expressed a desire to ask questions as part of the vocabulary

learning programme. This finding is relevant to the current study as it speaks to the need for students to interact and negotiate meaning with others. Another illuminating result, which is pertinent to this study, was that the participants who accessed the lessons through their computers did not access the lessons as soon as the lessons were sent and did not manage to read and work on all the three lessons per day. This finding attests to the accessibility of mlearning, while on the move. The context of the research being a contact situation, with students being used to memorising vocabulary individually, might explain why the researchers did not include an interactive feature in their vocabulary learning programme.

The current developments in mobile phone technologies have seen the rise of mobile apps being used for language learning (Godwin-Jones, 2011). While in the beginning, mobile learning depended upon SMSes such as the study by Thornton and Houser (2001) above, there is currently a myriad of interactive apps specifically for language learning such as Vocabulary.com; Magoosh; VoLT Vocabulary and Dictionary.com (these apps are described in Chapter 4- Developing the Mobile App). One such app-based study was conducted by Butgereit and Botha (2009). In this South African study, the researchers used a mobile-based language learning application called Hadeda to encourage Grades Four to Eight learners to practise spelling or memorise vocabulary using mobile phones. The vocabulary app was a collaborative effort between teachers and parents who selected the vocabulary to be learned and loaded vocabulary onto a web-based programme which, in turn, converted the vocabulary from text to speech and sent it to the learners' mobile phones as vocabulary exercises. On the web interface, users had a choice of language between English, Afrikaans, Swahili, French and German and the selected language would correlate with the sound file created for the pronunciation of vocabulary.

The piloting of the app lasted for a month and focused mainly on technical issues. The researchers found that phone type and phone age determined the ease of use of the app, with older phones not being able to play the pronunciation sound clips and certain kinds of phones not being able to recognise diacritic symbols. On issues that were not entirely technical, the researchers' findings pertained to the affective aspects of use such as: that the frustration when a phone could not support the app was a highly emotional issue with the younger users; that the participants took the time to help each other when they faced technical challenges and finally, that the participants were excited to be using Hadeda and

invited their peers to join the project. The researchers subsequently refined Hadeda to deal with the concerns raised. An example of refinement was that if a phone could not play the pronunciation sound clip, Hadeda would display the spelling of the word in lieu of an error message. What this research emphasises is the importance of refinement in technological innovations.

While there are many apps specifically for vocabulary learning (Ciskin, 2009), researchers and practitioners have started to explore social media apps for mobile learning. An example of a social media app being appropriated for learning was reported by Barhoumi (2015). In the study, the researcher used a control group of 34 students who had a regular two-hour class instruction every week while an experimental group of 34 students received an extra hour of course discussions on WhatsApp over and above the two-hour class time. The results showed that the experimental group outperformed the control group in the achievement test results. Secondly, the survey questionnaires revealed that the experimental group displayed more positive attitudes towards learning and the course than the control group. Although it could be argued that the experimental group's performance and attitude gains were based on the extra attention they received (three hours compared to two hours), the study, nonetheless, identifies a trajectory in mobile learning where apps, including those that had been traditionally employed for social media purposes, are now being explored for learning purposes.

2.2.2 Mobile technologies for learning

If the premise for vocabulary learning includes explicit teaching of form, meaning and use, repeated exposure to vocabulary as well as assessment, then there is a need for a teaching environment that is able to facilitate these essential factors in promoting vocabulary development. In ODL, such an environment would be better presented in a way that is accessible and flexible, possibly an environment that is integrated into the students' daily lives. Kennedy and Levy emphasise that using mobile phones for vocabulary development is of particular importance because using its technology "…means taking advantage of a technology that the students already consider an essential part of their daily lives" (2008: 328-329). The prevalence of emergent technologies in learning is supported by Ng'ambi who has stated, "A glance at the international dashboard of trends in higher education suggests that technologies have and will continue to impact the educational landscape" (2013: 652).

In this study, the term ‘mobile device’ refers to the cellphone or the mobile phone as these labels are interchangeably used. A decade ago, mobile phones were perceived as items of luxury and even symbols of wealth and status, but of late, they are, "a staple of day-to-day life" for all spheres of society (Pandey & Singh, 2015: 108). Teaching and learning are no exceptions with regard to the proliferation of mobile phones, as evidenced in mlearning. It is essential to clarify the notion of mobile devices. According to Kukulska-Hulme and Shield (2008), such devices include mobile phones, MP3 and MP4 players, PDAs, smartphones and tablets. Duman, Orhon and Gedik (2014), have made make additions to the above list to include portable music and video players (such as the iPod), handheld computers, pocket electronic dictionaries, notebooks, e-Readers, camcorders, game consoles and other devices. What is revealing about the evolution of technology is that mobile phones are the most commonly used of the above devices since they are multifunctional and one can carry out most of, if not all, the above activities on a single phone. The trend of mobile phones featuring more than other mobile devices in research is corroborated by other researchers as well (Burston, 2014; Wu, Jim Wu, Chen, Kao, Lin, & Huang, 2012). It seems that mobile phones are evolving from being instruments for making phone calls to multipurpose technology instruments. They are also relatively smaller, and therefore, more portable than other devices (Chinnery, 2006).

As far back as 2005, mobile phones were said to be catapulting Africa into the 21st century (LaFraniere, 2005). This claim was based on the statistics available at the time, reflecting that one in 11 Africans owned a cellphone. Between 1999 and 2004, the number of people with cellphones in Africa grew from 7.5 million to 76.8 million. Pyper (2013) calculated that, in the year 2013, there were six billion cellphone users in the world. The numbers attest to the accessibility of cellphones where in South Africa, 75% of those living below the poverty line own these devices (Pyper, 2013). In 2016, the ownership of cellphones had surpassed the population of South Africa by about 30 million connections. Figure 2.2 offers a reflection of cellphone ownership in South Africa.

Figure 2.2: Cellphone ownership.

Source: Shezi (2016).

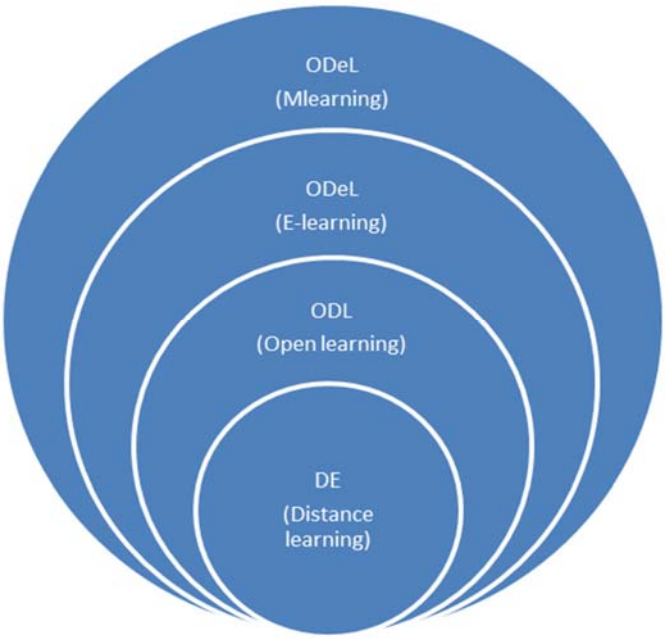
A discussion on mlearning is somewhat incomplete if it is not linked to the broader concept of e-learning. As a preface to mlearning, it is apt that a short review of e-learning is presented so as to ground further discussion.

Brown (2005: 303) defined e-learning as a "macro-concept that includes online and mobile learning environments". Sife, Lwoga and Sanga's (2007) definition of e-learning encompasses an even broader scope to include any Information and Communication Technologies (ICT) used to support and enhance teaching and learning. This definition includes technologies outside the internet such as CD-ROMs, podcasts, DVDs and digibands. These authors state that e-learning can be used to supplement contact teaching and learning or be utilised for communication in a course that is offered exclusively online. E-learning, therefore, involves any learning that takes place using devices, with or without the internet, including laptops, desktop computers and other such devices for online activities. This particular definition is supported by Seale (2013) who states that e-learning is often used as a unifying term to describe the fields of online learning, web-based training and technology-delivered instruction. These technologies are in many ways ideal for ODL contexts, such as Unisa, for lessening the distance in the teaching and learning environment, yet they are restricted because of students' limited access to computers. According to Michael Trucano from the

World Bank (2014), ideal technologies in e-learning are those that take affordability, accessibility, connectivity, usability and electricity constraints into account. In the South African context, most students cannot afford computers with internet subscriptions, and access to electricity is still a struggle for many.

Figure 2.3 depicts the extending range of availability, accessibility and benefits, from traditional DE, to ODL, ODeL and finally to mlearning.

Figure 2.3: Extending range of accessibility and availability



2.2.2.1 Describing Mobile Learning

Ten years ago, Kukulska-Hulme (2007) posited that mlearning as a concept needed to be conceptualised with more certainty through more research and studies, as it was not yet stable. More recently, mlearning has been described as “still in its infancy” (Brown & Mbati, 2015: 116), and thus necessitating more research in order to strengthen the concept of mlearning through a clearer definition. Traxler (2007) traced research and categorised definitions of mlearning into those which highlight that mlearning is technology-driven; is a portable version of e-learning; constitutes connected learning; is personalised and situated; and involves supporting student learning and development even when they are located in remote and rural places. These various features of Traxler’s definition address the positive gains of mlearning for ODL students, in that it provides e-learning benefits while it is portable, more connected and personal, catering for students even in remote areas where

computers are scarce. It would not help to design impressive e-learning interventions that are not accessible to those who need them most. Researchers in Africa such as Lephalala and Makoe (2012) have emphasised the importance of taking students' backgrounds into consideration in our curriculum development and, by extension, our intervention mechanisms.

As research in mlearning continues, greater emphasis has been placed on the mobility of the learning. This definition further evolved as Sharples et al. (2007) analysed the concept of mobile in mlearning to include mobility in physical space, mobility of technology; mobility in conceptual space; mobility in social space as well as learning dispersed in time. Sharples, Taylor and Vavoula (2007: 222) proposed a definition of mlearning as any learning "that takes place across multiple contexts amongst people through the use of interactive technologies". Li (2008) defined mlearning as ubiquitous where the learner interacts with the learning content and collaborates with peers and instructors through a mobile device. The benefits are convenience, effectiveness and flexibility of learning.

The world's largest and most diverse implementation of mlearning, the MoLeNET programme (2007-2009), provided a similar definition of mlearning to that of Li (2008), as "the exploitation of ubiquitous handheld technologies, together with wireless and mobile phone networks, to facilitate, support, enhance and extend the reach of teaching and learning" (Attewell, Savill-Smith & Douch, 2010: 1). A balanced view of mlearning is one that takes into cognisance the equal interplay between the technology and the user. To this effect, Park's definition of mlearning is the closest to a balanced perspective because it views mlearning as "the use of mobile or wireless devices for the purposes of learning while on the move" (2011:79). Additionally, mlearning should consider the mobility of content since mlearning allows for content to reside and be accessible in various contexts and platforms. To that end, Crompton has defined mlearning as "learning across multiple contexts, through social and content interactions, using personal electronic devices" (2015: 4).

2.2.2.2 Uses of Mobile Learning

Mlearning has been utilised in a variety of contexts to serve a plethora of learning needs (Brown & Mbati, 2015; Crescente & Lee, 2011). Using the benefits of the portability of the

device; the different features in the device; the usefulness and accessibility of technology as well as the pedagogical objectives of various projects, mlearning has been deemed appropriate to meet teaching and learning needs.

Mlearning has been used for administrative purposes (sending notices, announcements and reminders) and those where mlearning is used for affective purposes (encouraging students during examination periods) (Mostert, 2010; Naidoo, 2011).

Content delivery is also another use for mlearning although Thornton and Houser (2001) caution that content in mlearning should be delivered in bite-size chunks for convenience. Reading long and bulky documents on a small screen can be tedious. This challenge has unfortunately led others (Hlodan, 2010) to view mlearning as delivering snippets of content which do not contribute much to learning. However, mlearning does not provide bits of content, but rather "small components, activities or events within any mode of delivery" (Brown & Mbati, 2015: 118).

Closely linked to content is the use of mlearning for assessment purposes. Mobile phones, from a very basic model to the more sophisticated smartphones, have been successfully used for assessment, such as for university entrance exams (Laborda, Lopez & Royo, 2011). The most basic cellphone can use the Short Message Service (SMS) and the Unstructured Supplementary Service Data (USSD) where questions such as Multiple Choice Questions (MCQs) are answered by sending the corresponding option as a response to questions. These methods do not require internet connections. The more sophisticated smartphones can use more interactive apps and Quick Response (QR) codes for quizzes to help students through their materials.

2.2.2.3 Studies on the use of mobile learning in developing countries

Mlearning is a relatively young field of research, but there has been an increase in investigations since the year 2000 (Duman, Orhon & Gedik, 2014). While there may be instances of mlearning in Africa and elsewhere in Africa, Duman et al. (2014) refer to published studies based mainly in Europe and Asia. Recently, however, researchers such as Makoe, Brown, N'gambi, Letseka and many others are contributing immensely to research in mlearning, in its different facets, in Africa and South Africa. There is still a need, however, for

more research on mlearning in ODL contexts and language learning, in particular with regard to attending to the need for interaction.

One of the studies on mlearning in ODL and Africa was conducted by Makoe (2010) who investigated the pedagogical suitability of using cellphones to enhance learning through social interaction in distance education. The study focused on the use of Mxit, a cellphone instant messaging system. The study involved 23 Unisa students who belonged to five study groups. The data were collected over a period of six months and analysed their focusing on themes characteristic of social interaction. Makoe found that Mxit provided users with a relaxed environment that they owned, where they socialised and exchanged ideas in a language with which they felt comfortable. Makoe concluded that the Mxit environment provided a highly interactive space that enhanced participants' sense of community, which, according to Makoe, was correlated with motivation in distance learning contexts.

Makoe's study illustrated the flexibility and accessibility of mobile technology and the appeal it has for educational purposes. In addition, and most pertinent to this particular study, Makoe's research illustrated the effectiveness of student-student interaction in ODL. The interaction is "bi-directional" (Moore, 1989) and leads to engaged problem solving. It is against this background that the importance of student-student interaction in vocabulary teaching and learning is emphasised. According to Makoe (2012), students in ODL will support each other in groups and encourage each other, sharing responsibilities (affective support); solve problems as they learn and use new vocabulary (cognitive support); and where students will use social networks and mobile apps to keep in touch with the university and form study groups, no matter how far apart they are geographically (systematic support).

Kajumbula (2006) also illustrated how mlearning could be used as a support intervention for distance learning students in the distance learning section of Makerere University in Uganda. Kajumbula (2006) wanted to test the effectiveness of SMS technology in supporting students, specifically in sending messages keeping students up to date with events on the campus. The principal means of conveying messages at the time, the radio, was proving to be wanting. For one, there was no assurance that the targeted students would be listening to the radio when the announcements were aired. In short, there was no control over

students accessing the intervention. Secondly, students could not store the information for future referencing: the information was gone as soon as it was aired on the radio. The distance between students and the institution, thus, was more than geographic. In trying to bridge the distance, Kajumbula (2006) used a commercial SMS system called the DDE BROADCAST SYSTEM that enabled the university to send messages to students regarding upcoming events and other pertinent announcements so that the students would not miss these. The study exploited the broad availability of cellphones among students to keep them informed about current and upcoming events. The findings of Kajumbula's study confirmed that students felt connected to the university through the messages, even though poor cellphone reception prevented at least one participant from receiving messages. The results showed that participants appreciated the fact that with cellphones, they could save announcements for future reference. The participants noted that they wanted more SMS messages to be sent, related to study units to be covered, timetables, fees updates and new stock of textbooks.

While Kajumbula's study is a model for using mobile phones in distance contexts, especially in rural areas with limited technology, it also illustrates a concern about the concept of interaction. Kajumbula describes the SMS intervention as fostering interaction between the students and the institution, yet it seems there was little more interaction than a one-directional relaying of information about events in keeping participants informed. There is no evidence in the study of students exchanging views and ideas with the institution or other students or content. Interaction, according to Makoe (2012), resembles a conversation, an "integrated and structured dialogue" (2012: 5) in various interventions for student support. This is one thrust of this particular study, that vocabulary can be enhanced through interaction and that interaction is facilitated through mobile technologies.

In a study based in Ghana, Tagoe and Abakah (2014) investigated distance education students' readiness for mobile learning through the Theory of Planned Behavior. The researchers selected 400 students as a sample from a population of the University of Ghana's Distance Education programme, with 9,311 students. Although the authors did not mention the response rate to the administered questionnaire, the results showed that the high level of cellphone ownership indicated some level of familiarity with the technology. The benefits of mobile phones were indicators of readiness for mlearning, including access

to course work and ease of learning as well as portability of mobile phones and flexibility. The challenges expressed by participants indicated areas of lack of readiness including cost of the devices and other financial constraints; the intermittent supply of power; sporadic network failures; security and privacy issues where loss of the device could mean loss of study material.

Another related study on the use of social media for learning was conducted by Gachago, Strydom, Hanekom, Simons and Walters (2015) who investigated how three South African higher education institutions introduced WhatsApp into their teaching practices for both distance education and campus-based learners. That study collected data through a series of focus group interviews with two participants from the University of Western Cape and one from Stellenbosch University. The data were also collected from case studies conducted by the participants at their own institutions as well as the participants' reflections. In the first case study, the primary objective was the facilitation of undergraduate students' engagement with theoretical content. The lecturer used an existing WhatsApp group which had been used for social purposes and turned it into a platform where students and lecturer could engage with content in the form of questions and discussions. The second case study saw WhatsApp being used for extensive teaching where WhastApp facilitated communicative connection. Over and above teaching, WhatsApp facilitated the creation of bonds and relationships among the participants. In the third case study, WhatsApp was introduced to more mature students as an experiment where the lecturer emphasised that she was also learning to see how WhatsApp could be used as a tool for learning and keeping the group engaged. The researchers found that WhastApp supported blended learning as well as on-campus learning. They also concluded, "the accessibility and immediacy of WhatsApp as a mobile technology using learners' mobile phones, helps in facilitating the coordination of learning, blurring physical and geographical boundaries" (Gachago et al., 2015: 184).

While there are other studies on mlearning in developing countries, most of these studies focus mainly on attitudes and perceptions, particularly regarding the devices used for mlearning. Such studies include challenges of mlearning implementation in Nigeria (Osang, Ngole & Tsuma, 2013); student perceptions and readiness for mlearning in Nigeria (Chaka & Govender (2017); the possibility of using mobile technologies to implement social media

based services for graduate students in Ghana (Akeriwa, Penzhorn & Holmner, 2015); and opportunities and challenges of mobile learning in Zanzibar (Haji, Shaame & Kombo, 2013).

2.2.3 Open Distance Learning (ODL)

Since this study took place in an ODL context, a discussion on ODL seems incomplete without tracing its history through Distance Education (DE) and Open Distance Learning (ODL). The evolution of DE has been linked to the technological advancements in society (Garrison, 1985; Lauzon & Moore, 1989; Guglielmo, 1998; Taylor, 2001; Moore & Kearsely, 2005). In the 1800s, for example, DE was characterised by print-based mass production because of the influence of the invention of the printing press. The advent of radio and television saw DE introducing radio, television and teleconferencing broadcasts of lectures while the internet era has seen many DE institutions going online. Heydenrych and Prinsloo (2010) note a problem with mapping the DE evolution based on technological changes because it focuses on the delivery of content – paper based or radio broadcast– and does not consider issues such as learning theories as well as the owners of content. In the past, DE focused on the transmission of knowledge with Universities being owners of knowledge, whereas DE has now shifted to being characterised by interaction and seeing content ownership moving to the global community.

The need for interaction and flexibility is closely linked to the evolution from DE to Open Distance Learning (ODL). The shift from DE to ODL lies in the fundamental concept of openness. The idea of openness is espoused by Unisa (2008) in defining ODL as a "learning model that endeavours to bridge the time, geographical, economic, social, educational and communication distance between the institution and the students, the academics and the students, the learning materials and the students and amongst the students themselves." In other words, ODL has opened learning to everyone, wherever they might be (Moore & Kearsley, 1996). Openness in ODL is of particular importance in developing countries since, "For many countries in Africa, distance education seems to be the only option that can play a role on widening participation in higher education", (Makoe, 2015: 8). Open Distance Learning has thus opened higher education to the masses so it is no longer an elite system (Olakulehin & Singh, 2013).

Moore and Kearsley (2012) have also linked the openness of ODL to intentionally designed activities to open learning for everyone, wherever they may be. Indeed, Letseka and Pitsoe (2014) state that the descriptive marketing strategies for Unisa and ODL have included such 'open' related adjectives as 'accessible, flexible, supportive and affordable.' This means that students from various educational and socio-economic backgrounds come to Unisa with the hope that the ODL institution will help them achieve their educational aspirations. This creates a need for intensive student support systems since the students are under pressure to "to plan their academic programs, set their own study schedules, balance their studies with other responsibilities (work/family), communicate proficiently in writing, find and use learning resources well, and read and synthesize efficiently" (Brindley, 2014: 287). To this end, Makoe argues that students in ODL need to be supported in three main approaches, including "cognitively by developing study materials through mediation; affectively by providing an environment which supports students, that creates commitment and that enhances self-esteem; systematically by establishing administrative and information management systems that are effective, transparent and student friendly" (2012: 70). These three functions of support are similar to Rumble's categories, which include "excellent learning and teaching material, high-quality student support services and efficient logistical systems" (2000: 218). Tait (2000) breaks down the cognitive, affective and institutional functions of support into practical activities. These include: enquiry, admission and pre-study advisory services; tutoring; guidance and counselling services; assessment of prior learning and credit transfer; study and examination centres; library services and individualised correspondence teaching. This support, in some cases, includes continuous assessment; administrative systems; differentiated services for students with special needs such as disabilities, as well as materials which support the development of study skills, programme planning or career development. Table 2.1 illustrates how these activities fall into the three support categories.

Table 2.1: Functions of student support with support activities

SUPPORT TYPE	SUPPORT ACTIVITIES
Cognitive	• Tutoring • Library services • Individualised correspondence teaching • Materials that support the development of study skills, programme planning or career development.
Affective	• Guidance and counselling • Differentiated services for students with special needs of one sort or another, e.g. disability, geographical remoteness, prisoners
Institutional	• Enquiry, admission and pre-study advisory services • Credit transfer • Assessment of prior learning • Study and examination centres • Record keeping, information management and other administrative systems

Sources: Makoe (2012); Tait (2000)

In a distance learning context, thus, student support is provided in different forms and the use of technology is extensive. In fact, Mbatha (2014) asserts that ODL is characterised by the use of new Web 2.0 tools, which facilitate interaction between the student and the learning content, the institution, including lecturers, as well as among the students themselves.

Technology-mediated learning, such as mlearning, therefore, plays a significant role in facilitating that accessibility and availability of learning even when the physical separation from the institution exists. This view is promoted by Brown and Mbati who state that "mlearning holds much promise and provides exciting opportunities for open and distance learning" (2015: 116). Because mlearning provides flexibility and accessibility benefits related to technology and interaction as discussed above, Brown and Mbati aptly state, "we are merely seeing the tip of the iceberg" concerning research in mlearning (2015: 116).

2.2.4 Benefits of Mlearning

Keegan (2005: 14) argues, "It is not technologies with inherent pedagogical qualities that are successful in distance education, but technologies that are generally available to citizens."

Mlearning is considered as more beneficial over other modes of learning due to its availability. According to Duman et al., (2014) the benefits of mlearning for the students mainly include easily accessible content (Thornton & Houser, 2005); on-hand support (Kukulska-Hulme, 2009); accessibility (Godwin-Jones, 2005; Rao 2011) as well as facilitating much-needed interaction (Lu, 2008).

Other benefits of mobile phones are related to the convenience of the devices themselves in that cellphones are less expensive than computers and laptops (Chinnery, 2006). These devices are also cheaper to charge so that where electricity is intermittent, students can keep their phones operating. The portability of mobile devices is another benefit with Traxler and Kukulska-Hulme (2005: 5) pointing out, “mlearning devices are lightweight and handheld, while the sophistication of newer mobile devices is enticing”. To this effect, Prensky (2005) asserted that cellphones have the computing power of the mid-1990s computers while consuming one-hundredth of the energy. Bakari, Ishaq, Miyedu, Nykvist and Deutschmanm (2009) postulated that mobile devices could provide almost all the services that were conducted by the stationary personal computers of the past.

Because of the endless possibilities of multimedia one can access using mobile devices (Brown, Campbell & Ling, 2011: 144-158), mlearning has been used for graphic audio-visual to complement learning (Huang & Hung, 2010). Voice recordings also allow listeners to replay content as often as they wish. An advantage of this is that the learner carries this learning environment around with him or herself wherever he or she goes, learning a new language anywhere, anytime and at their pace (Begum, 2011). Through multimedia capabilities, mlearning caters for innovative ways to teaching such as augmented reality (Johnson, Levine & Smith 2009; Cook 2010). Augmented reality refers to applications where digital objects are related to physical objects (Specht, Ternier & Greller, 2011).

2.2.5 Challenges of Mlearning

Despite the benefits, there are also drawbacks related to mlearning and these can be broadly categorised as those that are related to the human factor; gadget concerns, technical difficulties and affordability. The challenges of mlearning have included physical attributes (Georgiev et al., 2004; Zhang & Adipat, 2009); content and software applications (Ally, 2009; Cochrane & Bateman, 2010; Deegan & Rothwell, 2010; Hussain & Adeeb, 2009);

network speed and reliability (Corbeil & Valdes-Corbeil, 2007; Park, 2011) as well as physical environment such as not being able to use the device outside, screen brightness or dimness, personal security.

Makoe (2011: 93) stated, “Despite studies showing the benefits of using mobile technologies, the use of these devices as educational tools has not gained momentum as it should. The reasons given for the slowness to the adoption to new technologies is based on variety of issues including lack of awareness of the affordances that mobile learning have to offer." The main reason for the lack of uptake relates to lecturers who can be described as digital immigrants (Makoe, 2011). Ncube, Dube and Ngulube (2014) assert that lecturers at Unisa are not ready for learning design and learning facilitation using the new digital media. This view of lecturer readiness, or lack thereof, is shared by Makoe (2011) who makes a distinction between ‘digital natives’ and ‘digital immigrants’. She states that lecturers are digital immigrants who struggle to operate in the digital era where they have to teach digital natives who are native speakers of the digital language and who “function better when they are connected” (Makoe, 2012: 92).

Another challenge to mlearning pertains to learners themselves. Lines become blurred between accessing knowledge through interaction and the distractions of social media (Gikas & Grant, 2013). A further challenge is that when students are young and unemployed, they are not able to purchase mobile phones. An example is that of a student whose access to a cellphone is intermittent because he does not own a mobile phone but has to use his uncle's (Kajumbula, 2006). The challenges related to devices refer mainly to the size of the cellphone screen, which tends to be too small for effective interaction with bulky materials. The problem of the screen size was taken care of when materials are “delivered in short concise chunks” (Thornton & Houser, 2002: 236). Closely linked to the screen is the issue of limited audio-visual quality related to the quality of cellphone and data size and “one finger data entry which may be time-consuming” (Chinnery, 2006: 13).

While the above issues are valid, it should be noted that mobile devices are improving every day. An example is how, in 2006, Chinnery posited that mobile devices had limited non-verbal communication and limited message length. New apps, such as WhatsApp, cater for messages as voice notes, images, video, and typing allowances with no limit on the number

of characters one can type. One can also send emojis as a non-verbal means of communicating their feelings. Users are also able to create groups for interaction.

In this particular study, cognisance is taken of the challenges related to technical unreliability, device error and human caution over mlearning novelty, but the benefits of accessibility and availability related to mlearning are substantial. The study is based on sound theories of vocabulary teaching (Coxhead, 2000; Nation, 2001) as well as interaction in distance teaching and learning contexts (Park, 2011; Makoe, 2012). It has been ensured, for example, that the content in this study will be delivered in small, manageable but effective, chunks that students can easily read on their mobile devices without the need to scroll up and down unnecessarily (Costabile, De Angeli, Lanzilotti, Ardito, Buono & Pederson, 2008). Over and above the vocabulary content, the technical consideration in this study is on the interface of the landing page, which is easily readable and uncluttered. Based on the general students' interaction on the UNISA Learning Management System Portal (LMS), myUnisa, the participants are familiar with using WhatsApp and other applications on the cellphone. The researcher herself is an avid user of mobile applications, which eliminated the concerns of apprehension over mlearning. From the experiences of the students, guidelines for mlearning in ODL will be established; guidelines that will not only take cognisance of the challenges of mlearning but also provide recommendations on how to circumvent as well as overcome these difficulties.

As discussed, some of the challenges of mlearning are linked to the device, technological issues, software and content. These challenges, however, are outweighed by the benefits which include access and availability related to numerous online and offline multimedia resources. Mobile technologies have been proven worthwhile for learning, but are we ready to embrace the affordances of mlearning for the benefit of the student?

In mlearning, the question of readiness relates to the instructors (Makoe, 2012), the learners (Rath, 2012) as well as the mlearning technologies to be used concerning content, context and purpose. In the same way that a difficult labour is not written off as impossible, challenges in mlearning do not warrant cessation of efforts. It is studies like the ones presented in this thesis that offer palliative assurance and context-specific alternatives and guidelines so that at the end, mlearning is successfully used for the benefit of the students.

Ultimately, it might be asked if mlearning is worth considering. While its challenges are acknowledged, mlearning is proving to be worth each difficulty because ultimately, the benefits outweigh the challenges. Any consideration of a technology that is capable of reaching people far and wide while providing an array of support mechanisms is worthwhile. This stance is supported by Keegan (2005) who argues that in the history of technology in education, no technology has been as available to citizens as mobile telephony.

2.2.6 Status quo in vocabulary teaching and language learning

Although there have been developments in the use of mobile technologies for teaching and learning, the research shows a prevalence of contexts where mobile phones are used mainly for administrative purposes. Where mobile learning is used for language learning, there used to be a predominance of SMSes, but WhatsApp is emerging as another tool for learning even though the latter has tended to be used mostly for facilitating communication between students and facilitators. There is a gap for research in the use of language learning apps, especially in view of the shortage of apps which are pedagogically grounded while they are technologically sound.

2.3 Conclusion

Vocabulary constitutes a crucial part of communication in any language. Therefore, the learning of a language would be very stilted if the learner did not acquire new vocabulary. Knowing the form, meaning and use of words requires explicit teaching as well as interaction. In a distance learning environment such Unisa's ODL, interaction is augmented as well as facilitated by mobile technologies. There is, therefore, a need for systematically planned vocabulary teaching programmes that speak to the ODL context and cater for interaction because vocabulary does not exist in a vacuum. This particular study, thus, presents a mobile programme that will enhance the participants' vocabulary through interaction; a programme that is much needed in an ODL context.

CHAPTER 3: THEORETICAL FRAMEWORK

3.1 Introduction

The aim of this Chapter is to identify and introduce theoretical frameworks in line with the objective of the study with regard to vocabulary teaching and learning through mobile technologies. In other words, the Chapter is used to create "a theory base" (Hofstee, 2006: 92) for the objectives of this study. This Chapter maps the search for a suitable theoretical base for this study by surveying frameworks that could have worked, but were not used because of certain concerns. The Chapter then moves to detailing the Community of Inquiry as a framework for this study. The Conversation theories are also discussed in detail as supporting framework in this study.

According to Siemens (2005), theory provides a link between knowledge and implementation. In order to investigate the use of mobile learning technologies to enhance the vocabulary learning of students in an ODL context, a search was undertaken for a theoretical framework that would be suitable for the research objectives in this study while adhering to the pragmatist paradigm, especially with the emphasis on its instrumental view on knowledge as it is "used in action for making a purposeful difference in practice" (Goldkuhl, 2012: 8). As a developing researcher, it was also important for me to find a theoretical framework that would not only guide theory, but also the practice in the form of aiding research (data collection and analyses). In short, the search was for a theoretical framework that would "provide order and parsimony to the complexities of online learning" (Garrison & Arbaugh, 2007: 158).

3.2 Theoretical frameworks

3.2.1 Conversation Theory

In searching for a grounding framework, a myriad of theories was contemplated and Conversation Theory (CT) was considered as a possibility owing to the emphasis on technology-mediated means of interaction, which are associated with technology-mediated vocabulary learning in this study. The CT grew out of Gordon Pask's work within Cybernetics. CT is "based on the premise that knowledge exists, is produced and evolves in action grounded conversations" (Boyd, 2004: 181). Through a series of conversations that may lead to new topics, the expert (who knows considerably more about the topic) and the learner are engaged in conversations that have to lead to an agreement about the area of

discussion. Boyd (2004: 183) contends that this theory is "very difficult to grasp" and that it is not understandable without certain ideas from the fields of cybernetics, automata, formal linguistics, computer science concepts, theorems and notations, cognitive psychology and neurophysiology. Researchers in the field of education have taken the purported complicated theory and have applied it to examine the processes of learning with technology (Laurillard, 2002; Sharples, 2003).

While this is a groundbreaking theory, CT did not exactly fit in with this particular study. There was a concern with two aspects of the theory that were not compatible with the gist and context of this study. The first problem is that CT "is constrained so that all topics belong to a fixed agreed domain and the level of language of each action is specifically demarcated" (Boyd, 2004: 186). The subject matter as well as the context do not allow me to place such stringent restrictions on them. Discussions on language and its use cannot be thus constrained. Secondly, Pask's CT involves an agreement at the end of the conversation, which is intimated to lead even to a deeper view of humanity (Boyd, 2004). While there are general agreements on vocabulary form, meaning and use, the eventual aim of the interaction is not that of reaching an ultimate agreement, but, rather, understanding. Sharples et al., (2005: 8) concur when they observe, "It does not mean that every concept must be negotiated and agreed". For these reasons, CT did not entirely fit in with this study.

3.2.2 Connectivism

The other theoretical framework that was considered was Connectivism because it is touted as a learning theory for the digital age (Siemens, 2007) that is aimed at providing a better understanding and management of teaching and learning using digital technologies (Garcia, Brown & Elbeltagi, 2013). The idea of making connections within Connectivism was emphasised by Siemens who stated that "learning is a network phenomenon, influenced by socialization and technology … our need to derive meaning, gain and share knowledge, requires externalization" (2007: 10). Connectivism, thus, could have been suitable for this study because it emphasised shared experience in digital spaces. Miller and Doering support the idea of knowledge that transcends acquisition when they succinctly note that "it is neither sufficient nor possible to amass a store of content knowledge in order to be considered 'learned" (2014: 10). In other words, knowledge has to be gathered collectively and shared or distributed. Distributed cognition, therefore, means, "No single individual is in

receipt of all required knowledge to solve a problem or complete an activity alone" (Boitshwarelo, 2011).

There were three principles of Connectivism that were closely related to this study. The first one was that *Learning and knowledge can rest in diversity of opinion*. This principle was related to this particular study in that WhatsApp was planned to be used as part of the intervention as a platform where participants would share ideas and exchange opinions. The study also relied on mobile devices which, according to Boyinbode, Bagula and Ng'ambi, "allow for students to be connected and, thus learning content can be accessed and interaction can take place whenever learners need it, in different areas of life, regardless of space and time" (2011: 2). The second principle, that *Learning is a process of connecting specialised nodes or information sources* was also relevant because the mobile phones would allow for students to "access course content, as well as interact with instructors and student colleagues wherever they are located" (Gikas & Grant, 2013: 19). Finally, the principle that *Learning can reside in non-human appliances* seemed pertinent since a single device offers many uses, which need to be tapped into for educational purposes (Rennie & Morrison, 2013). In this study, knowledge was found in cellphones on WhatsApp and VocUp.

Much as Connectivism had the potential for this study, there were three areas of concern. Firstly, there still exist concerns on whether or not Connectivism is a theoretical framework or a pedagogical view (Clarà & Barberà, 2014; Kop & Hill, 2008; Verhagen, 2006). While it could be argued that Connectivism is a relatively young framework and that perhaps it qualifies as such based on Sharples et al.'s (2005) guidelines for distinguishing a theory of learning which validate Connectivism as a theory of learning, there were still two methodological concerns that could not be disregarded. Connectivism could not offer clear guidelines for data collection as well as data analysis to help frame and articulate research. There was a need, thus, for a more guided framework for the study.

Based on these concerns, Connectivism was not used as a theoretical framework in this study. However, language learning in Connectivism is closely linked to Vygotsky's theory of social interaction (1978). Vygotsky asserted that it is through social interaction, in this case using mobile technology, that experiences are turned into knowledge using language as a medium of negotiation. Through the guidance of a teacher or in collaboration with capable peers, students' development is determined by interaction. Because of the link to

interaction in digital spaces, this study leaned towards the task-based approach to vocabulary development based on some guidelines of Task-Based Language Teaching. Researchers such as Ellis (2003) and Nunan (2010) highlight how language is developed when learners use the target language in particular learning tasks. TBLT places emphasis on language learning through interaction in the target language, using appropriate activities (Nunan, 1991). The idea of interaction is further emphasised by Motlagh, Jafari and Yazdani (2014: 1) who assert that TBLT is "based on the use of communicative and interactive tasks". Pellerin (2014: 5) stresses the importance of tasks by pointing out that task-based approaches "promote the creative and spontaneous use of language through tasks and problem-solving". TBLT activities can be divided into Focus-on-Form (structural accuracy); Focus-on-Meaning (fluency); and Intermediate TBLT, which balances form and meaning. As Pellerin indicates, current language learning tasks that are technology-mediated are highly organised and reflect pre-determined outcomes.

3.2.3 Multi-componential framework of word knowledge

A theory that was considered appropriate for framing the vocabulary teaching and learning section of this research was the theory of multi-componential word knowledge by Nation (2001). Nation has argued, "Vocabulary growth is such an important part of language acquisition that it deserves to be planned for, deliberately controlled and monitored" (2002: 267). The planning, control and monitoring, thus, are all part of directly teaching vocabulary. The question, however, is how does one teach vocabulary. While teachers recognise the importance of vocabulary improving proficiency, many of them struggle with acquiring the skills of incorporating vocabulary teaching into their lessons (Read, 2000) so learners can understand new words. It is imperative to clarify, thus, what it means to know or understand a word. Thornbury (2002) states that knowing a word means knowing its form and meaning. Thornbury proceeds to list the components of knowing a word, including word class, meaning, word morphology, pronunciation, derivations, grammar, collocations, homonyms, polysemes, synonyms and antonyms, hyponyms, lexical fields, register, and style and variety, and connotation.

Knowing how to spell a word and knowing what it means is incomplete, however, if we consider that we need vocabulary to function in a language. Larsen-Freeman (2003), while in agreement with the two components of knowing a word, adds a third element of knowing

the word, the element of use. Knowing a word can, thus, be subdivided and allocated to the three categories, as listed in Table 3.1.

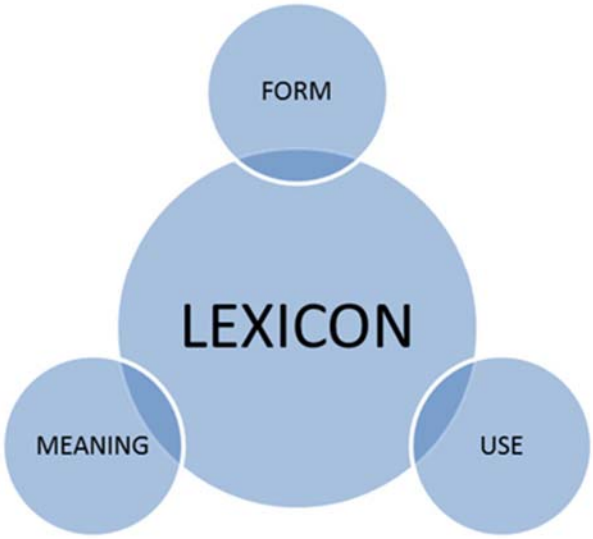
Table 3.1: Examples of form, meaning and use

FORM	**MEANING**	**USE**
word class, word morphology, pronunciation, grammar	meaning, derivations, grammar, homonyms, synonyms, antonyms, hyponyms	grammar, collocations, polysemes, lexical fields, register, style, variety, connotation

Source: Adapted from Larsen-Freeman (2003) and Thornbury (2002)

According to Larsen-Freeman (2003), form refers to how the word looks and how it sounds. In the table above, word class and pronunciation point to the form of the word. Meaning refers to denotation, while use refers to meaning in particular contexts. Oxford and Scarcela (1994) support the inclusion of the third component of use, stating, “knowing an L2 word also involves being able to use the word communicatively in the context of purposeful interaction." (1994: 232). When one says he or she knows a word, therefore, it means the person can recognise how it sounds or how it is spelt (for example, the difference between ‘vulnerable' and ‘venerable'); one can derive the denotation of that word outside of a context (the difference between a boy and a girl) and that person can use that particular word in a way that suits context, audience and purpose. In short, Nation’s (2001) multi-componential word knowledge of form, meaning and use is supported by other researchers. This framework embodies the view of vocabulary in this research where words are taught and learnt with a focus on form, meaning and use. The multi-componential word knowledge framework as portrayed in Figure 3.1 informed activities in this research in that the participants did not merely focus on spelling or knowing meanings of words, but they also worked on using the words appropriately.

Figure 3.1 The interlinking of form, meaning and use in vocabulary.



3.2.4 Interaction Theories

The first theoretical framework that was found suitable for this study was the Theory of Transactional Distance which was defined as “the universe of teacher-learner relationships that exist when learners and instructors are separated by space and/or by time" (Moore, 1993: 22). This theory defines distance not merely as spatial or temporal, but also as “pedagogic” (Moore 2007: 91). One of the main propositions of the theory is that as the number of dialogues increases, the distance between teacher and learner or learner and learner decreases. Because one of the main barriers to learning in distance education is the absence of interaction (Makoe, 2012), there is a consensus on the critical role of interaction for student support (Heydenrych & Prinsloo, 2010; Heydenrych, 2009; Tait, 2000; Moore, 1993). While “traditionally, interaction focused on classroom-based dialogue between students and teachers” (Anderson, 2003: 129), interaction is currently a crucial aspect of non-face-to-face teaching and learning contexts such as the ODL.

The driving principle in interaction is the mutual influence that people, and objects, exert on one another. It is important that stress is placed on the notion of mutual influence as it reveals interaction encapsulating the concepts of conversational dialogue (Holmberg, 1983); bi-directionality (Moore, 1989), collective development (Heydenrych & Prinsloo (2010) as well as the need for social, cognitive and teaching presence (Garrison, 2007).

Interaction, therefore, exists as a reciprocal concept for the cognitive, affective and teaching support. While student-student interaction presupposes that a student will be interacting with another student where Student A could be addressing Student B and Student B responding, other forms of interaction are at risk of being labelled as interaction when there is no real reciprocal, back and forth interaction involved. If mobile learning technologies are used to send bulk announcements to students without a mechanism for students to respond to the messages for clarity, should the need arise, the situation begs the question of how mutually interactive that scenario is.

There are different types of interaction, including student-student interaction and student-lecturer interaction as well as student-content interaction (Makoe, 2012). These interactions are all underpinned by the crucial role of technology in facilitating meaningful interaction (Garrison, 1989). For the purposes of this study, 'technology' refers to mlearning because of the benefits mentioned in previous sections linked to accessibility, cost-effectiveness, broad ownership as well as flexibility. The notion of accessibility is stressed by Keegan (2005) who argues that availability to citizens is the main defining characteristic of successful technologies in distance education. If students need interaction for success in ODL, they need technologies which are accessible and portable. If over 90% of Unisa students are more likely to own a cellphone than any other technology (Makoe, 2012) then it is essential that one investigates how mobile learning can be used as an intervention for student support in general and for developing the vocabulary of students in particular.

3.2.4.1 Student-student interaction

For many decades, the crucial role of peer influence through interaction has been acknowledged. In writing about student-student interaction in schools, Johnson argued that "Experiences with peers are not a superficial luxury to be enjoyed during lunch and after school" (Johnson, 1981: 5). Johnson's views on student-student interaction leant more on socio-emotional aspects, such as the interaction providing support for aspiration and motivation; contributing to social value and attitudes; influencing potential behaviours, and development of social roles. In contrast, Bernard, Abrami, Borokhovski, Wade, Tamim, Surkes and Bethel (2009) described student-student interaction as "interaction among individual students or among students working in small groups" (2009: 1247). This definition shows a shift towards a purposeful type of interaction, focusing on working in groups.

Student-student interaction has evolved, therefore, from a focus on socio-affective support to include more cognitive influences such as explanation, argumentation and negotiation and mutual regulation (Sher, 2009: 1962). More recently, benefits of students working together include increased higher- order thinking, greater engagement, higher self-esteem and higher test scores (Jacobs, Renandya & Power, 2016). Most recently, the explosion of social networking apps has seen educators exploring the use of social media to facilitate student-student interaction.

Bouhnik and Deshen (2014) examined the use of WhatsApp for facilitating learning while Ferguson, DiGiacomo, Gholizadeh, Ferguson & Hickman (2017) integrated Twitter to facilitate online group journaling for postgraduate studies; Ventura and Martín-Monje (2016) taught vocabulary through Facebook whereas DeSchryver, Mishra, Koehleer and Francis (2009) compared the use of Moodle against Facebook for group discussions towards enhancing social presence. These examples demonstrate that modern technologies, used for student-student interaction, can develop reciprocity and cooperation among students through threaded discussions, bulletin boards and email applications (Beldarin, 2006). In ODL, with its characteristic physical and cognitive distance, facilitating student-student interaction might seem an arduous task, yet the use of mobile technologies has been shown to facilitate peer interaction as shown further in this chapter. While ODL provides “exciting opportunities for not only increasing the reach of education and reducing its cost but, most important to us, for increasing the quality of teaching and learning” (Abrami, Bernard, Bures, Borokhovski & Tamim, 2011: 83), mobile learning activities have been prominently designed for learning settings different from the classroom (Frohberg, D., Göth, C. & Schwabe, 2009); thus mobile technologies are well suited for facilitating student-student interaction in an ODL learning environment.

3.2.4.2 Human and non-human interaction

Much as interaction is mostly coetaneous with human-human engagement, with reciprocal effect, there exist two kinds of interaction relating to human and non-human interaction where learners interact with content and devices. Student-content interaction “is a defining characteristic of education” (Moore, 1989: 2) where the learner engages with educational content. While student-student interaction is defined as an interaction between one student with another student, with or without the real presence of the instructor (Thurmond, 2003),

student-content interaction can also take place with or without the presence of the teacher or other learners. The ODL context is rife with student-content interaction where learners "talk to themselves" about the information and ideas they encounter in a text, television program, lecture, or elsewhere (Moore, 1989: 2). This process is called didactic conversation (Holmberg, 1986) and there is a need for research into how students interact with content using mlearning technologies to facilitate learning in ODL.

Marquis and Rivas (2012) presented an analysis of a range of studies in mlearning from a variety of higher education institutions where they make use of mobile phones. One of those studies is by Lim, Fadzill and Mansor (2011) who described the Open University of Malaysia's efforts of enhancing the blended learning approach for undergraduate distance learners with the successful implementation of mlearning through SMSes. The SMSes were used mainly for the university to communicate with the students, sending them announcements such as those pertaining to upcoming events and information on administrative changes.

Because these days student-content interaction involves engagement with content through some form of technology, it stands to reason that student-device interaction is explored. Studies have demonstrated the use of mobile technologies for student-content interaction where students engage with course content including assessment through technology (Başoğlu & Akdemir, 2010; Chen & Huang, 2007; Thornton & Houser, 2001). Student-device interaction is thus referred to as student-interface interaction where students have to interact with the gadget delivering the content before engaging with the said content (Hillman, Willis & Gunawardena, 1994; Makoe, 2012). While higher education institutions have employed the use of mobile devices for disseminating information on institutional and administrative information including announcements on deadlines, events, venue changes and other urgent messages (Keegan 2005; Traxler & Leach 2006), this study will explore how students interact with devices in order to interact with content towards learning through mobile phones.

3.2.4.3 Student-teacher interaction

Another important aspect of interaction is that involving student and lecturer. According to Heydenrych (2009: 34), "the complete learning experience of distance education students is still dependent on sufficient interaction between student and educator". Part of the core business of the university revolves around teaching students, and the lecturer still plays a

pivotal role in that teaching. Makoe (2012) has illustrated the importance of the lecturer by presenting her different roles which include encouraging students, facilitating learning, correcting misconceptions as well as offering assistance. In ODL, where the lecturer cannot physically see her students every day and where the openness often means thousands of students, student-lecturer interaction is limited (Makoe, 2012). If interaction is to take place, the lecturer needs considerable amounts of planning, flexibility and reinvention if she has to support her students effectively through interaction (O'Rourke, 2009).

A study that illustrates lecturer planning, flexibility and reinvention is presented by van Rooyen (2010). In this study, second-year Accounting students at Unisa, an ODL institution were supported using Mxit, a social networking site. The lecturer for the Accounting module noticed that most students were registered on Mxit and were communicating with their peers. The lecturer decided to exploit the accessibility and wide availability of the platform allowing for interaction with students. The level of flexibility and commitment of the lecturer is evident in that students were invited to interact with him during the day, at night and on weekends. This openness tore down the distance of time and space. The interaction was bi-directional in conversations where the lecturer encouraged students and provided content-related assistance in real time.

Previous attempts at student-lecturer interaction had involved planned group visits where lecturers would visit various regional centres to conduct face-to-face group sessions with students. The group visits were not successful as about 12% of students attended them. The low attendance was due to lack of interest as well as logistics related to the cost of travelling to regional centres or students not being able to get time off work (Prinsloo & van Rooyen, 2007). The introduction of Mxit, therefore, provided an accessible, faster and cost-effective means for interaction that benefitted more students.

In this example, the affective support provided by the lecturer is evident in the encouragement and motivation provided to students, which help to alleviate stress (Rasheed, 2007). In addition, the interaction provided students with a sense of belonging, as they feel cared for (Makoe, 2012). The study above also demonstrates the cognitive support offered through student-lecturer interaction in that the lecturer contributes to the understanding of course content. Where students struggle with misconceptions, the lecturer was readily available to clarify concepts. The systematic support leant again on the lecturer's

ability to plan and integrate course content in the interaction. An example of integrating course content is the ability of the lecturer to use Mxit in connection with the student portal, myUnisa.

The role of the lecturer in distance education is changing drastically (Cant, Wiid and Machado, 2013; Siemens, 2008; Bates, 2008; Brindley, 1995). The key consensus is that lecturers first need to acknowledge that there are ODL specific skills they need to develop in addition to being leading experts in their teaching fields. Such skills include fair and ethical behaviour and technical expertise (Cant, Wiid & Machado, 2013). From van Rooyen's study, it should be added that the flexibility to engage boldly within the technological changes in the education and lifestyle landscapes is for the benefit of the student. The willingness and ability of the lecturer to commit to student-lecturer interaction, however, also play a significant role in the affective, cognitive and systematic support of the students.

3.2.5 Technological Pedagogical Content Knowledge (TPACK)

Because of the role of the teacher in developing technological interventions and facilitating learning in online environments, the Technological Pedagogical Content Knowledge (TPACK) theory (Koehler & Mishra, 2009) was considered viable for this research. The components of TPACK include technological knowledge (TK), content knowledge (CK), pedagogical knowledge (PK), pedagogical content knowledge (PCK), technological content knowledge (TCK) and technological pedagogical knowledge (TPK). According to Koehler and Mishra (2009) the crux of TPACK is the theory that effective and efficient teaching with technology are three components of content, pedagogy and technology, including the relationships among and between them. As the name suggests, TPACK presupposes that good teachers are those who have knowledge and expertise of technology (devices, programs and environments) pedagogy (how to teach), content (subject matter). In short, it is about being knowledgeable of what to teach, how to teach and where to teach. It is no wonder, thus, that the TPACK is used to guide teacher training and professional development (Rienties, Brouwer & Lygo-Baker, 2013).

The TPACK framework is based on Shulman’s (1987) Pedagogical Content Knowledge (PCK) theory with the addition of the technology aspect. The TPACK is a useful theory to ground initiatives “for teacher educators, where the goal was to build faculty knowledge about technology-enhanced teaching” (Figg & Jaipal-Jamani, 2017). The strength of TPACK as

providing clear guidance for teachers is equally its main discrediting feature for this particular doctoral study. This study goes beyond the teacher, but focuses also on the students and how they interact with technological interventions. Using the TPACK for this study would have ignored other important aspects of learning, especially in ODL. TPACK was deemed as providing a single view of learning since it "offers several possibilities for promoting research in teacher education, teacher professional development, and teachers' use of technology." (Koehler & Mishra, 2009: 67). Because the TPACK seemed teacher-oriented, there was a need for a theoretical framework that would encapsulate other crucial aspects of teaching and learning including the learner.

3.2.6 The Community of Inquiry

An apposite framework for this study is the Community of Inquiry (CoI) (Garrison, Anderson & Archer, 2003). Perhaps as a launching pad for the discussion as well as justification for this theory, this section should start by revisiting Sharples, Taylor and Vavoula's (2005: 2) guidelines in hypothesising a theory that would guide mlearning. They argue that such a theory should first acknowledge the one distinctive feature of mlearning, which is that learners are constantly on the move, and according to Sharples and Vavoula (2002), learning across contexts. These two authors proceed to state that a theory for mobile learning should cater for learning that happens outside the classroom and the traditional places of learning. Further, such a theory should be based on contemporary accounts of practices that enable successful learning by citing the United States National Research Council's (1999) list of attributes of successful education, which includes learner centredness; knowledge centredness which includes effective and efficient teaching and curriculum; assessment centredness; and community centredness, which includes working together and sharing knowledge.

The three components of CoI, in other words, Social Presence, Cognitive Presence as well as Teaching Presence, are in line with the guidelines for a theory on mlearning. These three are directly linked to community centredness as well as knowledge centredness respectively, while the other attributes of successful education are part of vocabulary learning. Through the three elements of CoI, deep and meaningful learning is facilitated in online and mobile learning contexts (Anderson, 2016). According to Wicks and Sallee (2016), CoI provides templates as it aids practitioners with instructional design models. The CoI provided an

effective and efficient instrument that has helped me since conceptualisation of research objectives, the methodology as well as the analysis of data. Because this project brings together the area of vocabulary teaching and the use of technology mobile devices, it was important to find a theoretical base that would help synergise these two worlds while demonstrating their symbiotic relationship, especially within ODL.

3.2.6.1 Key Concepts in CoI

Before embarking on a detailed discussion of the elements of CoI, it is imperative that the key concepts of the framework be demarcated. Community in the CoI refers to the role-players in the teaching and learning and or research environment. Within the higher education context, such as in this study, community is viewed as "essential to support collaborative learning and discourse associated with higher levels of learning" (Garrison and Arbaugh, 2007: 158). Community, therefore, includes those who take part in the activity of learning; these include teachers and learners.

The second part of CoI, inquiry, refers to "an investigation into some part of reality with the purpose of creating knowledge" (Goldkuhl, 2012: 7). In the CoI, therefore, the investigation is in the interplay between the role-players and aspects of the learning environment in order to create knowledge. The inquiry aspect of CoI reflects the pragmatic paradigm in this study because inquiry is seen "as a natural part of life aimed at improving our condition by adaptation accommodations in the world" (Cronen, 2001: 20). The changes and adaptations involved in the inquiry are geared towards improving conditions, the same as the action towards a solution immanent in pragmatism. Goldkuhl highlights the link between CoI and pragmatism when he argues, "Dewey's concept of inquiry is central to the application of pragmatist thoughts in research" (2012: 7). Inquiry, therefore seeks improvement not only for the sake of change, but also searches for improved knowledge since "a key idea of inquiry is thus to create knowledge in the interest of change and improvement." (Goldkuhl, 2012: 8). This pragmatic change in action, thus, is suited to the methodology of DBR, which is focused on designing an intervention that brings a change and solution to a problem through an iteration of changes. The emphasis in this study, therefore, is not merely the efficiency of the mlearning technologies for vocabulary learning, but the inquiry looks even into the appropriateness of such interventions for ODL and how the role players work together towards learning.

3.2.6.2 Elements of CoI

The CoI consists of three main elements as discussed below.

Social presence

Social presence refers mainly to the Interaction for teaching and learning at a distance (Anderson, 2016). According to Moore (1989) and Makoe (2012), interaction pertains to student and student; student and teacher, student and content and, for this particular study, student and device. Makoe (2012) highlights that the main barrier to learning in distance education is the absence of interaction. Social presence, therefore, should not be viewed as only a socio-affective platform, for mere socialising, or "information acquisition" (Garrison, 2007: 63), but it should also lead to resolution as groups work together purposefully as they learn together. In short, social presence is for purposeful engagement towards learning through purposeful interaction (Scarcela, 1994). The social presence is subdivided into three categories of open communication, which is indicated by risk-free expression; group cohesion, which encourages collaboration as well as "affective expression which can be indicated by the use of emoticons" (Garrison & Arbaugh, 2007: 159).

Cognitive presence

Closely linked to social presence is cognitive presence, which is "the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse" (Garrison & Arbaugh 2007:159). The prominent immanent features of the cognitive presence – construction and confirmation of meaning, reflection and discourse – highlight a shift from learning that is individualistic and resides in an individual's mind. Instead, meaning is constructed and confirmed together with others through discourse. Herein lies the significance of the interdependence between presences; social presence is necessary for the development of cognitive presence (Beuchot & Bullen, 2005; Garrison & Arbaugh, 2007). According to Garrison et al. (2001), cognitive presence is realised through a four-phase process which includes a triggering event; where some issue or problem is identified for further inquiry; exploration, where students explore the issue, both individually and corporately through critical reflection and discourse; and integration, where learners construct meaning from the ideas developed during exploration. Garrison, Anderson and Archer (2001) also proposed that the integration phase typically requires an enhanced teaching presence to probe and diagnose ideas so that learners will move to higher level

thinking in developing their ideas; after this resolution can take place. The progression from the identification of a problem for exploration to the resulting stage of resolution includes the social presence and teaching presences while demonstrating the progression of learning. Cognitive presence facilitates critical thinking related to "the dynamics of a worthwhile educational experience" (Garrison, Anderson and Archer, 2010: 6).

Teaching presence

The said educational experience would not be worthwhile without a systematic facilitation of learning through the teaching presence. In fact, Garrison, Anderson and Archer (2001) assert that student interactions are not sufficient, by themselves, for effective online learning. In other words, while cognitive presence is developed through social presence, this process is facilitated by well-designed teaching. Teaching presence refers to "the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes" (Garrison, et al., 2000). In short, the social and cognitive presences will not lead to effective learning if the platform is not designed and facilitated effectively.

Anderson, Rourke, Garrison, and Archer (2001) further distinguished between three components of the teaching presence involving instructional design and organisation, facilitating discourse as well as direct instruction. These pertain to course planning and designing; engagement through various types of interaction as well as the intellectual leadership provided by the teacher. The role of the teacher, then, cannot be overemphasised as a catalyst for progression as the teacher provides direction through design, facilitation and direct instruction (Garrison, 2007: 67) In short, the teacher is not an expendable variable of effective learning, especially in technology-enhanced learning, but she is needed in planning, execution as well as direct involvement in the process.

Without the teacher's expertise, even the most novel technologies will remain 'educational toys' (Fry, 1963) with little to nothing to offer for effective learning. Teaching presence therefore highlights, yet again, that the three presences are interrelated and interdependence. In fact, Garrison, Cleveland-Innes and Fung (2010) assert that social presence is a mediating variable between teaching and cognitive presence, while teaching presence causally influences social and cognitive presence.

According to Garrison, Anderson and Archer (2010), the CoI framework has since been adopted and adapted by many across the globe as a framework for researchers as well as practitioners. In this study, the CoI helped to frame the research as well as organise data analysis. The structure provided by the CoI categories were trusted because they have been researched and confirmed through factor analyses by Garrison, Cleveland-Innes, and Fung (2010), Arbaugh and Hwang (2006) as well as Arbaugh (2007a). In this study, therefore, the main elements of CoI were used to guide teaching and research. In addition, the categories and indicators as presented in Garrison and Arbaugh (2007: 159) were used to label the themes in the analysis. Figure 3.1 illustrates the CoI's elements, categories and indicators.

Figure 3.2: The Community of Inquiry elements, categories and indicators

ELEMENTS	CATEGORIES	INDICATORS (examples only)
Social Presence	Open Communication	Risk-free expression
	Group Cohesion	Encourage collaboration
	Affective Expression	Emoticons
Cognitive Presence	Triggering Event	Sense of puzzlement
	Exploration	Information exchange
	Integration	Connecting ideas
	Resolution	Apply new ideas
Teaching Presence	Design & Organization	Setting curriculum & methods
	Facilitating Discourse	Sharing personal meaning
	Direct Instruction	Focusing discussion

Source: Garrison and Arbaugh (2007)

3.3 Conclusion

In sum, the CoI was chosen as appropriate for this study because, firstly, it is compatible with the paradigm or pragmatism in this study. Secondly, CoI informed both research and practice (Anderson, 2016) in this study. Thirdly, CoI provided templates in aid of instructional design models (Wicks & Sallee, 2016). Finally, this framework was used with confidence because it is a tested, validated and well-researched theoretical framework (Garrison, Anderson & Archer, 2010). The structure of the community of inquiry framework has also been confirmed through factor analyses (Garrison, Cleveland-Innes & Fung; 2004; Arbaugh, 2007; Arbaugh & Hwang, 2006). Interaction, knowledge discovery and sharing over digital spaces form the framework for this study. Inasmuch as some studies have covered the use of mobile learning in language learning, this study sought to close the gap in research with regard to language development, particularly in ODL contexts.

CHAPTER 4: DEVELOPING THE MOBILE APP

4.1 Introduction

The aim of this Chapter is to respond to the objective of designing a mobile application aimed at supporting English vocabulary teaching and learning. It is based on pedagogic foundations of vocabulary development while remaining cognisant of technological qualities related to mlearning. While it was quite an arduous task to balance the language and technological facets of this Chapter, and the study in general, it is hoped that the product, VocUp, illustrates how the two worlds of vocabulary principles and technological principles can be merged as an intervention for responding to the aim of this study.

At this juncture, it should also be stated that it was crucial for this chapter to be included here for two main reasons. Firstly, it is part of the second phase of DBR pertaining to the development of a solution that is informed by existing design principles and technological innovations (Amiel & Reeves, 2008). Secondly, VocUp is a significant part of this study as it introduces emerging solutions for vocabulary development in ODL. Because readers of the research need details of every aspect of a DBR to determine whether they could replicate this study in their own contexts (Anderson & Shattuck, 2012), it was imperative for the chapter to be detailed. In short, "the researcher is careful to document the time, commitment, and contingencies that are involved in the creation and implementation of the intervention" (Anderson & Shattuck, 2012: 16). This chapter, thus, maps the steps taken in developing a vocabulary learning mobile app for first-year ODL students by describing the architecture, user interface and features of the app known as VocUp. The app development steps including planning, testing, piloting, implementation, evaluation and revision are described. The section also discusses salient lessons learned from the experience in relation to mlearning in ODL contexts.

4.2 Background

The evolution of the mobile phone has seen the device turning into much more than an instrument for making calls. Modern mobile phones are also cameras, music players, social media as well as learning devices, to name but a few of their attributes. What makes mobile phones versatile is their capacity to be used for various functions through application systems (apps). An app can turn a phone into a flashlight, spyware, movie theatre or bank. We can indeed do almost anything with cellphones (Prensky, 2005). With the myriad of

mobile apps available, one can be assured that daily activities, including learning, can be enhanced through mobile apps. While it is acknowledged that there is a plethora of language learning mobile apps, including English vocabulary learning apps, the researcher points to a dire need for apps that are contextually relevant, particularly for Open Distance Learning (ODL) students and especially in Africa.

According to DBR prescripts, the first phase involves the analysis of the practical problem by means of the literature review. The literature on vocabulary teaching and learning, thus, helped to shape the vocabulary app that was in the process of being created. The following section presents a literature review of the vocabulary principles underpinning the development of VocUp. Important to note with regard to vocabulary teaching and learning principles is that there is no one core set of principles for vocabulary teaching that guides and frames all teaching and research, but many models and frameworks have been put forward as illustrated in the Literature Review chapter. Because a huge number of models and principles exists, this study relied on Kafipour, Yazdi, Soori and Shokrpour's affirmation that "Any techniques or tools which can be used to learn vocabularies quickly, easily and independently are called a vocabulary learning strategy" (2011: 65). For the benefit of this study, Folse's principle that "every language learning programme needs a systematic plan for vocabulary instruction including explicit teaching, practice and assessment" (Folse, 2010: 152) was chosen because it offers a practical guide for practitioners and researchers on the core elements for vocabulary development.

4.2.1 Principles of vocabulary development

In attempting to find a theoretical grounding for the app, therefore, this study was guided by these principles in that the app was required to teach vocabulary explicitly; it had to cater for practice and allow for assessment. Chinnery (2006) in writing about the benefits of technologies in language learning, argues that technologies are not instructors, but are instructional tools; consequently, the teacher is an important part of using technologies for language learning in that he or she facilitates the retrospective application of pedagogy. In other words, the technology afforded by the app was used to promote vocabulary learning.

The first vocabulary teaching and learning principle on which the app is based relates to explicit teaching of vocabulary. To incorporate this principle, Nations's (2001) multi-componential word knowledge framework that focuses on form, meaning and use was

employed for four central reasons. The multi-componential framework is systematic and provided a much-needed structure on how to teach vocabulary as well as frame and articulate this research. Secondly, the framework, which has been researched and validated over 16 years, is tried and tested. Thirdly, it was relevant for the context in which vocabulary was to be taught: the students needed to learn the form of words, their meaning and how to use them appropriately in various settings. The fourth reason pertains to the paradigm, pragmatism, on which this study is based. It is the practical use of vocabulary in real settings that makes the multi-componential word knowledge relevant to this study. In short, VocUp had to allow for explicit teaching of word form, meaning and use in different contexts.

The second principle of vocabulary teaching pertains to practice through repeated exposure to the vocabulary and opportunities for rehearsals. According to research (Stahl, 2005; Rott, 1999; Nagy, 1997) vocabulary learning and instruction emphasise repetitiveness of word exposure in maximising learning. VocUp, therefore, had to provide for repeated exposure in the form of the words being used in example sentences as well as in exercises. VocUp also needed to cater for recycling words for increased repeated exposure in that previously learned words were to be used as part of subsequent examples and exercises. This meant the participants, through VocUp, had to be given opportunities to use the said previous words and build up to the new words.

The third principle of vocabulary development relates to testing. According to Wesche, Paribakht and Sima (1994) and Zimmerman (1997), incorporating exercises as part of vocabulary learning leads to effective vocabulary development. This assertion is emphasised by Hashemzadeh (2012) who echoes that exercises form part of vocabulary teaching and learning activities as they help learners to focus on specific vocabulary items, which in turn contributes to identifying gaps in understanding. It was not sufficient that VocUp would teach vocabulary form, meaning and how to use those words- it was crucial that a kind of assessment be incorporated, as revealed by the literature, allowing users to demonstrate their grasp of the new words and letting the exercises indicate the gaps in understanding.

4.2.2 Technical Development

After exploring how vocabulary should be taught, the principles of ODL, which constitute the context of this study, were relied upon. ODL institutions, such as the University of South Africa (UNISA), afford students the opportunity of conveniently pursuing their studies while

engaging in their day-to-day activities. The challenge, however, is that these students typically study in isolation (Park, 2011). The spatial and temporal distance often means that the students are separated from their peers, instructors and even the physical institutional resources, such as the library (Makoe, 2010). For language teaching and learning, thus, the distance often means that there is a crucial need for support in language learning and use. To reach these students, the best vehicle for the delivery of the vocabulary intervention would be a mobile app. In looking for vocabulary apps that could be used, a search was made on the three most popular app Operating Systems (OS): IStore (IOS, such as iPhone), Google Play (Android, such as Samsung) and Microsoft Store (Symbian, such as Nokia) as it was considered that an existing app could be used as an intervention. With over a million apps available (Joorabchi, Mesbah and Kruchten, 2013), the available ones were explored for vocabulary learning, bearing in mind the essential vocabulary teaching and learning principles. The following were noted as the most important aspects of available apps (note that the summary is focused on this particular study). The ensuing table (Table 4.1) affords an overview of some of the available language learning apps for mobile phones.

Table 4.1: A glimpse into some available apps for vocabulary learning

App type	Example	Benefits	Drawbacks
Paid apps	Vocabulary.com	Focus on form and meaning with examples in paragraphs	Students might be wary of paying extra
Loaded app	VoLT Vocabulary	Extensive vocabulary including synonyms and antonyms, with memory keys	Download might be an issue owing to large files
Quiz-focused	Magoosh Vocabulary Builder	Vocabulary level/ achievement	The focus is on completing quizzes
Images and animations	English Vocabulary Daily	Provides visuals and images	Downloading animated images is expensive
Context and purpose bound	SAT, GRE, ICALT, TOEFL vocabulary	Practice for specific exams and tests	Cultural bias
Pedagogic foundations	Vocabulary Booster	Spelling, testing, use fragmented	Does not cover the multi-componential nature vocabulary
Vocabulary selection	Dictionary.com	Provides daily vocabulary development	Vocabulary at an advanced level

Source: Shandu, 2017

At the time, it seemed prudent to use one of the existing apps because they promised improved vocabulary for users. Some of the available apps provided in-depth, explicit teaching of vocabulary, which included synonyms and antonyms. Other apps furnished images and visual cues as part of vocabulary teaching and resources. Yet other apps offered daily vocabulary delivered to the user, together with definitions and examples of how that word had been used in literature. While the benefits of the apps were appreciated, the characteristics that would have created a difficulty for the ODL student could not be overlooked. Some apps, for example, were too purpose-specific in that they were aimed at providing preparation for specific standardised tests such as the TOEFL and GRE. Other challenges related to the fact that some apps required payments. The main reason for hesitation over using existing apps, however, was the lack of synergy with existing theory on the pedagogy of vocabulary teaching. For example, Zimmerman (1997) states that incorporating exercises when teaching vocabulary leads to effective vocabulary learning, but some of the apps surveyed found provided just a definition and some word use without giving opportunities for testing understanding. Other apps merely tested word knowledge in the form of quizzes without explicitly teaching the vocabulary. Another concern was the fragmentation of word knowledge that deviated from the multi-componential nature of vocabulary (Nation, 2001) which highlights the importance of focusing on form, meaning and use. Some apps, in this regard, provided definitions through a digital variety of bilingual dictionaries.

Given the limitations of the surveyed apps, an app, which would strike a balance between the pedagogical (content) thrust and the technological (vehicle) delivery, was developed. The app had to conform to the vocabulary learning principles of explicit vocabulary teaching (Feldman & Kinsella, 2005; Biemiller, 2004; Nation, 2001); rehearsal and practice (Stahl, 2005; Nagy, 1997) as well as incorporating testing (Hashemzadeh, 2012; Wesche, Paribakht & Sima, 1994). At first, using an app development company that would develop and maintain the new app was considered. Although this would have been the most logical and safest route, the researcher wanted to be aware of the intricacies of a tool that was about to be advocated as an intervention.

4.3 Steps to developing the app

4.3.1 Conceptualisation

The first step was to decide on what was required to be taught. Research emphasised the importance of developing the language learning environment before deciding on the role of mobile technologies and further emphasises focusing on the learner ahead of the technology (Salaberry, 2001; Colpaert, 2004). It was important to ensure a balanced match between pedagogy and technology (Sweeney & Moore, 2012). There was a need for increased vocabulary for the purpose of increased proficiency and better chances of success (Schmitt, Schmitt & Clapham, 2001). Thus, it was decided that vocabulary would be taught as described by Nation and Waring (1997) and Larsen-Freeman (2003): focusing on form, meaning and use. Based on lessons from Thornton and Houser (2002) short lessons were created which were labelled Word Capsules. Each word capsule contains the word, part of speech, definition and three sentences for different ways in which the word could be used as well as three exercises for further application and testing. To illustrate the concept of a word capsule, the word *bask* is used. After detailing that this entry is a *verb*, a definition is entered, such as:

"*To sit or lie enjoying the warmth, usually exposed to the sun, for relaxation. Bask is also used to mean deriving pleasure especially from attention*."

Subsequently three sentences exemplifying use are presented as:

Take care to wear sunscreen as you bask in the sun this summer.

My sister basked in the limelight as she received awards for sports excellence.

I've had it with her indolence; she spends her days basking in the sun when she should be helping me with chores.

The word usage examples are followed by exercises that serve as providing more opportunities for using the new word and to test understanding:

1. *Which of the following songs would you most likely associate with bask?*

   I'm gonna soak up the sun

   Ain't no sunshine when she's gone

   Crying in the sun

2. Choose a feeling that best goes together with basking.

Irritation

Fear

Joy

3. Another word for bask could be

Burn

Sleep

Revel (please note that revel was being recycled in this exercise because it had been a word of the day prior to 'bask')

The above example demonstrates that each of the word capsules encapsulates form, meaning and use as dictated by the multi-componential nature of word knowledge (Nation, 2001). It is necessary to note that the words were carefully selected from the Vocabulary Levels Test (Schmitt, Schmitt and Clapham, 2001). The 10 000 word levels from both versions of the test were used. Anecdotal evidence from years of marking first-year English assessments indicated that many students would not be likely to know these words as the aim was for the participants in the study to experience learning new words. Another reason for choosing the 10 000 word level was that language learners who have grasped the most frequent 10 000 words in English command a wide vocabulary and may be able to cope with the challenges of studying at University in English, which is a second language for many of the students in the context of this study.

4.3.2 Planning

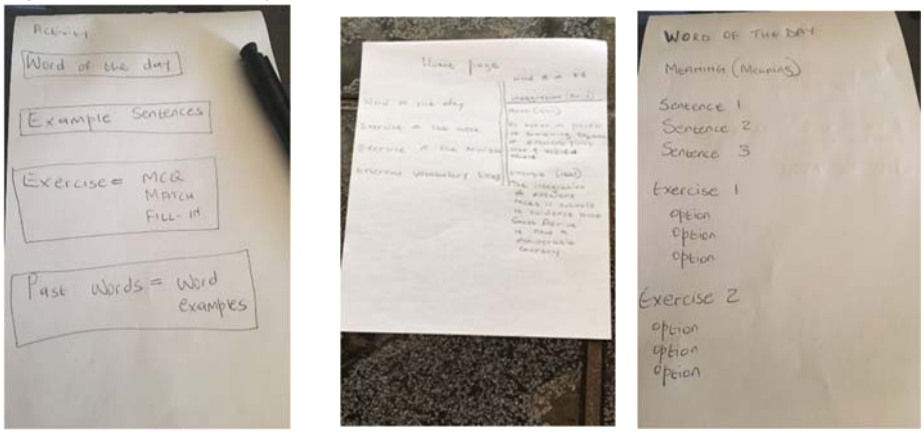
The app was developed with the help of an app development company. A decision first had to be made on the Operating System (OS); the Android system was selected. According to Joorabchi, Mesbah and Kruchten (2013), there are currently almost two million apps with the Android taking 52% of the market share; Apple taking 38% of market share and AppWorld and Windows with 6% and 3% respectively. These percentages were compared to Peruzal's website, in which they stated the Android OS was the most widely used with 84% of app users operating on it (Peruzal.com, 2016). For coding the app, the open source platform, Android Studio was used because it is a comprehensive platform with a complete

software stack for a mobile device (Gargenta & Nakamura, 2014). In other words, Android contained all the tools and frameworks needed for developing a mobile app (Gargenta & Nakamura, 2014: 1)

Conceptual images

The initial conceptual ideas were emailed to the developer in order to provide them with a sense of what was envisaged, enabling them to chart a plan of action.

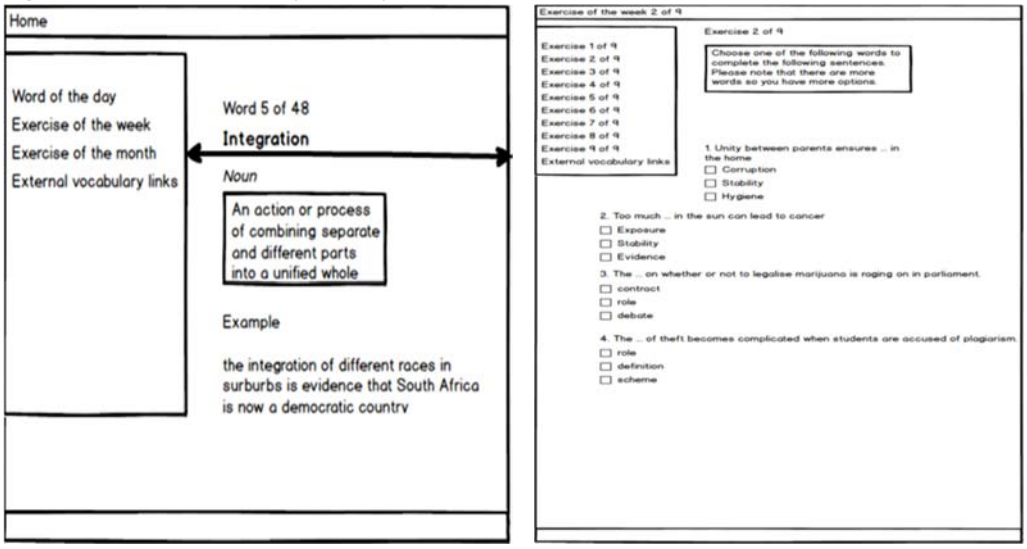
Figure 4.1: Initial conceptual sketches



Through these sketches, the developer gained an idea of what the envisioned app had to contain, such as a screen that would have the word of the day, example sentences and exercises as well as past words. It was further indicated that there needed to be a space where the user could access sentences as examples. The initial sketches gave the developer an idea, but one which was not very clearly articulated on the details for the app. Secondly, the initial sketches had overloaded each screen with information and they needed to be refined. It was important to envision and think 'in screen', in other words, to imagine what this process would look like in the end on a cellphone screen.

In refining the sketches, technology in the form of Balsamiq was relied on. Balsamiq is a website for developing app mockups, to draw ideas that somewhat resembled what the app should look like on the phone screen. The following sketches were created on Balsamiq as illustrated in Figure 4.2.

Figure 4.2: Initial Balsamiq mockups



The above figures are clearly not mobile app mockups, but website mockups. This example illustrates the importance of collaborating with experts in the DBR method where each role-player brings their expertise into the study.

4.3.3 App development workshop

The app development workshop lasted for five days, from 08h00 in the morning until after 16h00. The training was intensive, with just the trainer and two trainees. We were taught programming while we coded our own apps. Through TeamViewer, our facilitator was able to see into our computers to monitor progress. We also shared files and links through Skype. In the course of the workshop, we progressed from developing the User Interface to Functions and Content of our apps. The stages of development were guided by the principle of incremental development which dictates that one starts with the most basic features of the app and gradually adds to it, according to feedback and revisions (Gargenta and Nakamura, 2014). The development steps included the following:

a) Setting up the environment for Android development: the following programmes were downloaded in preparing the computer for developing the app.
   - Android studio: the platform for creating the app; where all the codes for instructions are entered. This is the app's home.
   - Java Development Kit: this was to enable the computer to understand and 'speak' the language of the app.
   - Android SDK: is for compatibility with the app

- Genymotion: this is a virtual phone – emulator – on the computer that looks like a real Android phone. As one codes and instructs the app, one brings up the emulator to see what it will look like on the phone. One can choose if one wants to view a phone or tablet.

b) Developing User Interface (UI). This was a process rather like creating the packaging of the app, its view and layout – so that it looks good and works well. There were different layouts to choose from such as relative and list layouts as well as card view. For VocUp, a linear layout and card view were used because they were deemed uncluttered and displayed the different sections of a word in a presentable flow.

c) Background colours were then created, including font colours and special characters such as bold and italic. It was decided that the word of the day would be bold and in a larger font so it would stand out. The colours and graphics were kept to the minimum to facilitate an uncluttered look.

d) The sections of the app, called activities, were divided into *word of the day*, which had subcategories of the word itself, part of speech and definition. The next activity provided the examples, which contained a list of three sentences. The third activity was the exercises, which included a list of three questions. Each question activity contained the question itself, three options, one correct answer and a check button. This was a fascinating exercise that involved writing a condition code for the check button. The condition code resembled the narrative of a tale (if the selected option does not match the correct option then a false notification is returned: the option turns red and shakes. If the option matches the correct answer, then the option turns green). The last activity contained past words, ones that had been taught in previous days so that the users could always go back and find them.

e) I then had to code the instructions for transitions between screens: sliding from word of the day to exercises to past words and back to exercises.

f) The next step was to tell the app what to do and when. This is called the Activity Life Cycle: when a phone has been switched off and then on; when the app has been inactive; when the user closes the app (onCreate, onStart, onResume – Running, Paused, Stopped).

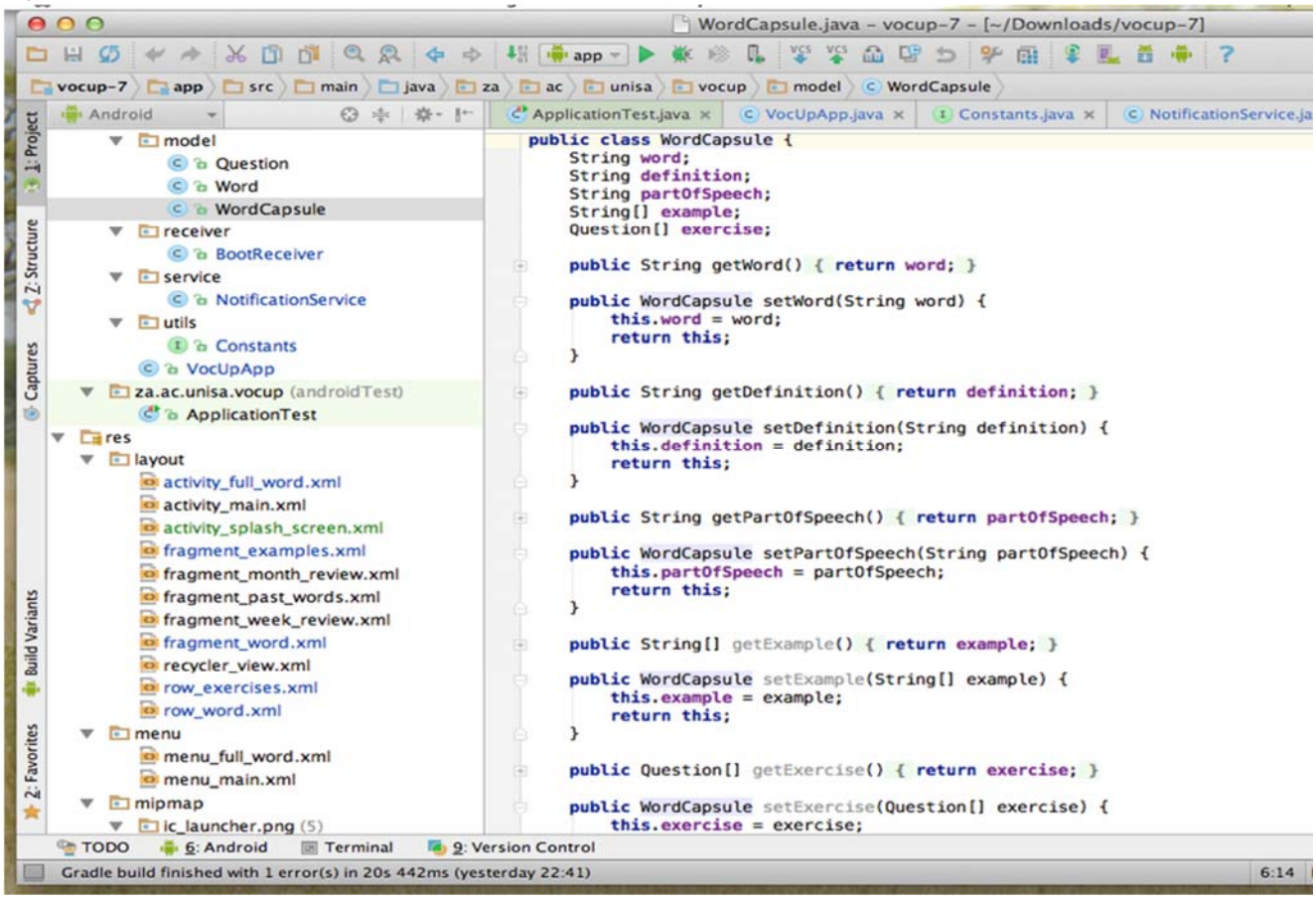
g) The instructions were coded for the app to perform background activities where the app would periodically connect to the cloud to pull down updates.

h) Alarms were then set for the app to send a new word to the users every day. The alarm was set at interval-Day, which meant a new word would be sent at 24-hour intervals.

i) For binding the activities together, Butterknife was used, which is a system of linking the activities so they are synchronised. For instance, when the word of the day was *throttle*, the screen for example sentences would show example sentences for *throttle* and have exercises for *throttle* as well. Figure 4.4 shows a screenshot of the activities.

j) While putting in code and instructions, the app was consistently run on the Genymotion emulator to test whether the instructions were being applied (test while developing).

Figure 4.3: Activities code



4.3.4 Adding vocabulary content

Once the container and instructions had been set up, then the content (vocabulary) had to be added.

a) While coding the instructions for the app, a Word file with all the Word Capsules to be used was also being created. Each word capsule contained the word; its part of speech; its definition; three sentences exemplifying usage and three exercises for testing understanding.

b) In devising definitions, an understanding of what each word meant was written and different online dictionaries were checked for verification. The *Oxford Learner's English Dictionary*; Dictionary.com and Merriam-Webster dictionary.com were consulted. For some word capsules, a colleague contributed material when we created the capsules together. The capsules developed without the colleague were sent to other colleagues and acquaintances to check for clarity, correctness and ease of use.

c) In order to put content (words and sentences) into the app, Parse.com was utilised. This is what a list of examples looks like on Parse: ["My country may be warm, but we never experience torrid extremes.","Their marriage could not survive the torrid financial times and they called it quits", In torrid weather, people are most likely to spend their time at the beach."]. The parenthesis means all sentences are under one activity (one screen). The quotation marks show the demarcation between sentences. The indicates the beginning of a bold font while signifies closing the bold. Parse is an intelligent program as it saves automatically. One negative feature is that if one deletes something, there is no undo capability. Figure 4.4 is a screenshot of a Word Capsule and Figure 4.5 is a screenshot of the word capsule on Parse.

Figure 4.4: Word Capsule

Wily
Adjective
The character of being cunning and crafty. Describing someone who is usually tricky in his/her actions.

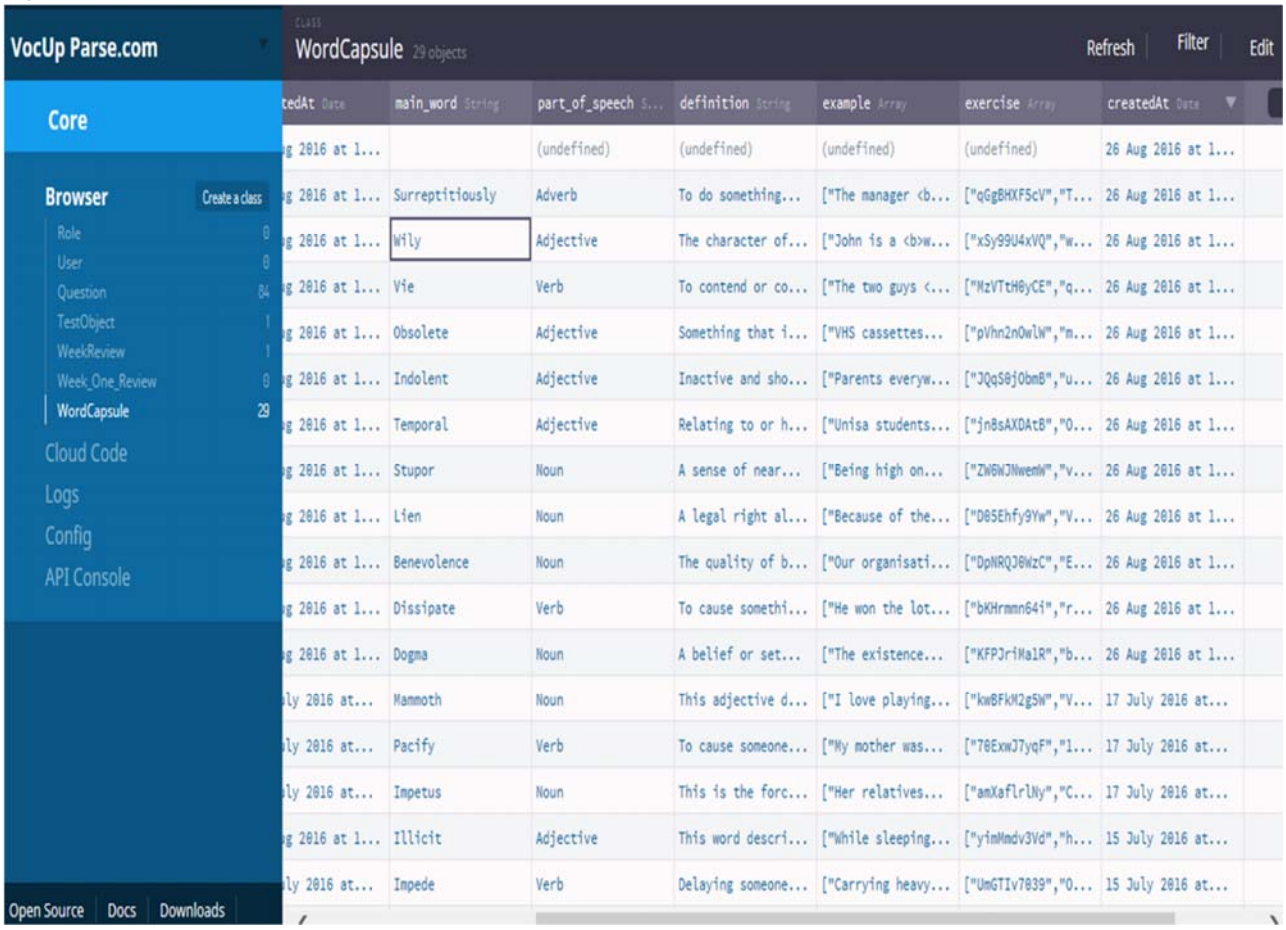
Examples
John is a wily character. I am not surprised he managed to trick his way into winning the tender.
It is hard to believe anything she promises because of her wily ways.
I often laugh at some of the wily tricks students use to get away with not submitting their assignments on time.

Exercises
Complete the following sentence by choosing the correct option.
The _____student had not completed her assignments so she resorted to wily ways.
forthright
indolent
benevolent

Which of the following words would you not associate with a wily person?
reliable
crooked
disingenuous

Which of the following idioms is closely related to wily
as sly as a fox
as stubborn as a mule
as wise as an owl

Figure 4.5: Parse entries



Parse simplified and expedited the coding process for the content. On parse, words and phrases were entered under the categories created earlier – typed in the word of the day under main_word, example sentences under examples. Parse wrote the code for the sentences and words typed in. In the event that code had had to be written for each of the word capsules, it would have taken longer and would have ended in a document where each of the vocabulary entries would have its own code as exemplified below:


```
[
 {
  "main_word": "<b>Convoy</b>",
  "definition": "A group of vehicles or ships travelling together typically for protection",
  "part_of_speech": "Noun",
  "example": [
   "Linda missed her bike <b>convoy</b> and thus had to travel to the Karoo by herself.",
   "The pirates attacked, but they were no match for the secret service <b>convoy</b> transporting armour.",
   "The VIP <b>convoy</b> caused commotion during this morning's rush hour."
]
```


4.3.5 Adding the app icon

An icon was then created which would make the app identifiable on one's phone amongst the many other icons. In creating the icon, a website called Iconaid.com was used. It is a user-friendly icon developer site where one can choose colours and text and enhancements to create the desired icon effect. The icon was kept free from too many colours and animation as simplicity is key with VocUp. The app was then saved and a copy sent to BitBucket for remote safekeeping, so that the code for the app is accessible remotely from anywhere.

4.3.6 App testing

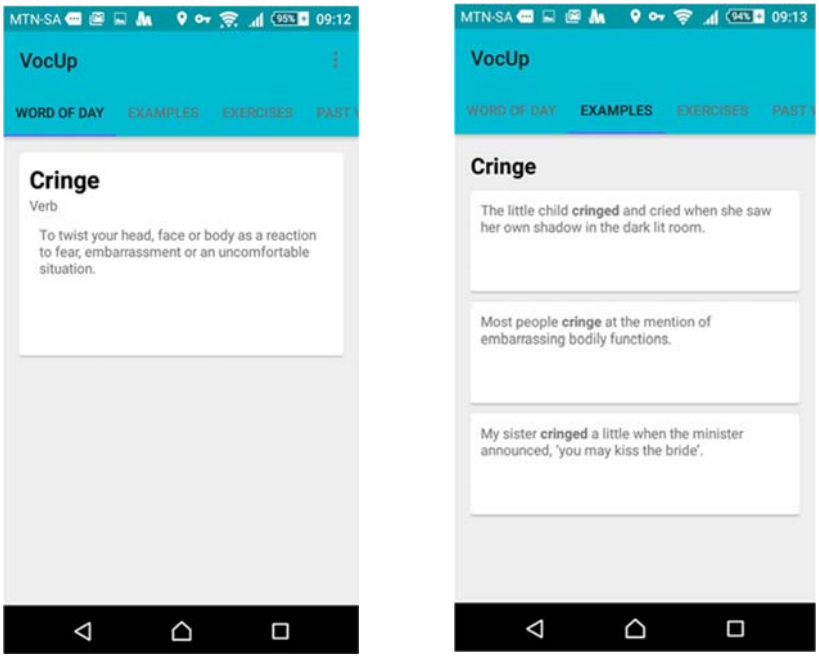
When the app looked and worked well on Genymotion without glitches or errors, it was sent to external parties for testing, using TestFairy. Colleagues and family were requested to test the app because it was still in the incubation phase. Feedback was received on the technical aspects of the app such as ease of use as well as the content such as typos, options and answers to exercises. The comments were used to revise the app and send it back for testing. It was important to remind the testers to uninstall previous versions before installing

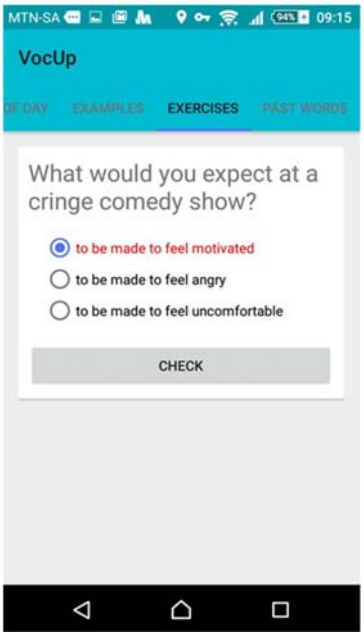
newer ones. Downloading a newer version of VocUp without uninstalling the older one meant the latest version was merged with the glitches and errors of the previous one.

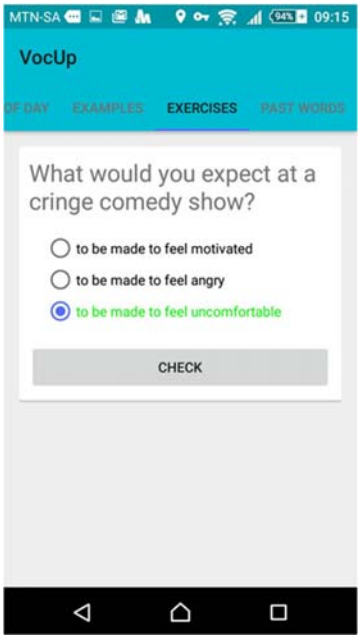
4.3.7 VocUp overview

The app, VocUp, sends a vocabulary lesson to users each day. Each lesson contains elements of form, meaning and use. The user slides the screen to access the different activities. VocUp is not cluttered, in consideration of the busy ODL users who have to learn while on the move. VocUp transmits a notification to the user when a new word is sent. This feature is designed to invite the busy ODL student to take some time and do some studying. Initially, though the app was developed as being self-sufficient to encourage independent study. VocUp was used in conjunction with WhatsApp to facilitate interaction. Users could choose to use VocUp on its own or work through the lessons, then proceed to WhatsApp to interact with peers regarding the word of the day. Figure 4.6 depicts some of the screenshots of VocUp as displayed on the phone.

Figure 4.6: VocUp screenshots







4.4 App evaluation

The following evaluation is based mainly on VocUp as an intervention for vocabulary development. It depends on the purpose of that evaluation (Sharples, 2009). The goal of this particular evaluation was to inform design principles; therefore the focus fell on the quality of VocUp's design and how it facilitated vocabulary learning as an intervention. According to Parsons and Ryu (2006: 17), "Quality in a mobile learning system can be assessed both in terms of product quality and in terms of the quality of the learning experience". The interrogation of the characteristics of VocUp in this study was guided by previous research on quality in mlearning. Koole's FRAME (2009) was consulted, especially as regards the considerations for device aspect, learner aspect as well as social aspect. Pertinent to the issues of quality are the device aspect, as well as the intersection of device usability and social technology. Another source was Parsons, Ryu and Cranshaw's (2006) design requirements for mobile learning environments where they assert that issues of quality in mlearning refer to user role and profile, mobility, interface design, media types, communication support as well as the elimination of technical errors. Sarrab, Elbasir and Alnaeli's (2016) quality model was used for this evaluation. The reason the latter model was chosen largely pertained to it having synthesised previous quality models and having taken

into account the recent developments in mobile technologies. In the words of Sarrab et al., the model provides “developers with concrete actions that will reach the preferred quality level” (2016: 101): for a developing scholar, it is useful to have details that help in articulating the thoughts and insights relevant to the study.

Technological innovations are created to fulfil certain needs. For example, banking apps were created to fulfil a banking purpose, therefore, the app enables us to bank. The purpose, ultimately, is to do so. In this study, thus, the purpose is vocabulary development, but it is important for the enabling app to be of quality for the purpose to be fulfilled. People create technology to meet a certain need. The following evaluation, therefore, uses a quality model by Sarrab, Elbasir and Alnaeli (2016) in order to assess the intervention. Table 4.2 presents an overview of the evaluation and is followed by an in-depth discussion on the various aspects of VocUp quality.

Table 4.2: A quality model of technical aspects for mobile learning services

Technical aspect	**Short description**	**VocUp examples**
Availability	Accessibility associated with mlearning	- Word capsules sent early in the morning - Past words accessible in the app for revisiting and reviewing
Quick response	Avoiding delays in response	- Downloading and access prompt due to data size - Exercises quickly alert user to incorrect answer
Flexibility	Offering options for the user	- Flexibility of time and place of use - Content flexibility - Type of learner and learning style flexibility
Scalability	Accommodating changes made to the system	- Accommodated changes on alarms and activities - Migrated system to new hosting site
Connectivity	Maintaining connectedness for collaboration through instant interactivity	Learner-device interaction
Reliability	Consistency and trusted functioning without system failure	- Reliability affected by system error at the beginning. - System correction improved reliability
Functionality	Accuracy and suitability of the app based on the needs of the users and their contexts.	- VocUp taught vocabulary explicitly - The app functions such as notifications improved functionality
Usability	Ease of use	- Sliding screens between activities - Accessing word of the day and past words
Security	Achieving data confidentiality, integrity and availability	- Participants wary of VocUp security - VocUp does not carry high-risk confidential information such as student numbers and academic records or bank account details

Source: Adapted from Sarrab, Elbasir and Alnaeli (2016)

Availability

Based on the evaluation model above, the first technical aspect of quality pertains to availability. Quality means that "Learners can access the required information irrespective of time and location" (Sarrab et al., 2016: 102). As far back as 2002, Keegan noted that one of the main benefits of mobile phones is their availability. This assertion is supported by research that has shown mobile phones to be part of students' lives, with examples being cited from America, the Philippines and South Africa (North, Johnston & Ophoff, 2014; Lepp, Barkley & Karpinski, 2015; dela Pena-Bandalaria, 2007). The availability of mobile phones, therefore, presents plenteous opportunities to make resources available whenever and wherever students can access their phones. In this study, the quality marker of availability was achieved in three ways. Firstly, VocUp made the Word Capsules available early in the morning. This meant the participants could access the word capsules before, during or after their morning travels to work, Secondly, VocUp retains past words within the app so that at any time, the user could access previous words whenever they needed to revisit them.

Quick response

Quick response is crucial in stakeholder satisfaction (Sarrab, Elbasir & Alnaeli, 2016). Although Sarrab et al. focus their notion of response time mainly on interaction and the students receiving prompt responses to their queries and posts, the response is also associated with avoiding delay without being limited by time and location (Corbeil & Valdes-Corbeil, 2007). Within VocUp, quick response was facilitated by restricting the size of the app. The app largely contains text and the sentences are short and pithy. There are no animations or videos, which might delay the functioning of the app from download to everyday use. Secondly, quick response was facilitated through the learner-device interaction made possible by the interactive exercises. When a user chooses an option, the app promptly alerts the user as to whether the option is correct or incorrect. This interactivity helps the user to identify gaps in understanding if an incorrect option is selected.

Flexibility

Perhaps one of the most prominent appeals of mlearning is its provision for flexibility (Huang, Hsiao, Tang & Lien, 2014; Motiwalla, 2007; Shandu, 2017). Flexibility refers to the adaptability of mlearning to the lifestyle and contexts of the user; it relates to the fact that

mlearning gives busy people options to study on the moves (Gordon, & Dodman, 2014). The notion of choices is further highlighted by Jacob and Issac (2014) who state that mlearning allows students to study at their chosen time, pace and place, giving them options (2014: 19). In this study, VocUp afforded flexibility in that participants could access their study material anywhere and anytime they found an opportunity for their phones; their studies were not dependent on time or space (Quinn, 2000). There were three types of flexibility in this study. The device was flexible in that it was not tethered to a workstation; the content was flexible in that it was not restricted to a given moment or structure in which it could be accessed; and finally, there was no limit to the exposure or number of times the participants could access their learning.

Scalability

Closely linked to the flexibility of content and device, is scalability, which denotes to the "ability of an m-learning application to accommodate changes made to the system." (Sarrab, Elbasir & Alnaeli, 2016: 103). In other words, designers have to be able to make changes to the system with ease, while the changes should not affect the system program or the teaching and learning programme. It was of great help that I knew how to make changes to the app whenever they were required. This does not negate the importance of the developer as the expert, but it empowers the researcher as practitioner to be able to make some changes and know about the inner workings of an app used by the students. Secondly, the app development platform used, Android Studio, allowed for going to the *Manifest* and making changes under each activity with ease and without disrupting the learning. For example, the alarm for sending the new word in the morning had been set at 7 am each day. After some interaction with participants, though, it was realised that it would be more beneficial to set the new words to be distributed earlier in the day, at 5 am, to allow more flexibility of access to content. Finally, new word capsules were added onto the app without interfering with previous words on the app. When the WordCapsules' host site, Parse.com was rested (discontinued), the app was migrated to a new host site, Heroku.com with ease because its code had been saved on GitHub. These changes happened behind the scenes, with no disruption of learning for the participants.

Usability

Usability is arguably the most common feature of quality assessment of devices in mlearning, as it is the most frequently reported in research. According to Sarrab, Elbasir and Alnaeli, usability refers to "the qualitative characteristics that determine the most effective way of utilising the user interface" (2016: 103). In other words, usability refers to the ease with which the user can learn to use the application as well as the ease with which the application is used. The emphasis on the user as well as the functioning of the app is stressed by Dirin and Nieminen (2013) who state that usability covers the ability to learn to use the technology and the ease of using the technology without errors. VocUp was easy to download and utilise, even though some participants needed special help with downloading. At the beginning of the study, VocUp presented some errors, which necessitated that we stop using it. The participants vented their frustration at dealing with these errors, which mostly comprised the app sending the same word on consecutive days. This technical glitch hastened the second iteration of the study – using just WhatsApp to send and discuss WordCapsules. In subsequent uses of VocUp – after it had been fixed – the participants stated that the app was user-friendly and they were able to learn to use it with ease. They were able to slide between screens to access the information they needed.

Functionality

The functionality of the app brings together the needs of the users and the context in which they use it (Little, 2013). While it is important that the app is user-friendly and functions without error, it is equally important that it serves the needs of the users. According to Sarrab et al. (2016), functionality includes aspects such as accuracy and suitability. Initially, the functionality of VocUp was compromised when it crashed, but VocUp operated accurately after having been repaired. VocUp performed its primary function; it delivered vocabulary activities. Its functionalities were also suitable for busy ODL students. As an illustration of suitability, VocUp presented vocabulary without crowding the app with unsolicited and redundant information; the notification envelope reminded the otherwise busy students to engage with the new words; the exercises were set so they would promptly alert the user to incorrect options. In short, designing and developing the app kept the users in mind. The participants, as users, suggested ways of improving it, such as adding audio clips with the pronunciation of the words. Since such changes would increase the suitability

of the app they would be incorporated into its subsequent revisions. In the final iteration of the study, using both VocUp and WhatsApp, the two platforms of learning vocabulary complemented each other's functionality. What could not be done on VocUp was achieved on WhatsApp, such as the audio clips on pronunciation, which were sent as Voice Notes.

Reliability

The application should perform its intended functions and operations without experiencing failure, known as a system crash (Sarrab, Elbasir and Alnaeli, 2016: 104). Reliability refers to the trustworthiness of the app to function consistently as it is supposed to (Kitnav & Davcev, 2012). At the beginning of the study, VocUp did not pass the reliability test: it crashed and the participants were unable to trust it because they viewed it as unreliable. This study is proof that reliability can affect novel teaching and learning interventions due to lack of trust. It is this researcher's belief that the experience of unreliability influenced the participants' preference for WhatsApp. After VocUp was corrected, the participants gradually used it again because its increased reliability was proven. They expected to find new words early in the morning and they did find new words each morning. The users expected to see example sentences if they slid the screen to the left; they did, and, thus, VocUp was deemed reliable. So important is reliability that the fall of one of the great technologies, *BlackBerry*, was due to reliability issues; people could not trust the phones or the system (Sands & Tseng, 2008). Sands and Tseng continue to compare the unreliability of *BlackBerry* with the more reliable iPhone where problems were more likely due to accidents – such as people dropping and breaking the phones – than with system errors. As this study proved, innovations fail if they are not reliable.

Connectivity

According to Pereira and Rodrigues (2013), connectivity improves collaboration through instant interactivity, which is not limited by time and space. WhatsApp provided the collaboration and instant messaging related to connectivity in this study. Especially essential and poignant in this study were the barriers to connectivity. Primarily, the issue of finances was important for the context of this study, since the participants have other financial demands in addition to their tuition and study fees. Participants noted that they were wary of downloading VocUp, as they feared it might be costly. The implication for this context is that innovations should take cognisance of the backgrounds of users.

Security

Kambourakis (2013) found that security concerns "can hamper the penetration of mobile technologies into the education realm, and hence prevent stakeholders from capitalizing on the benefits that these technologies bring along." (2013: 68). Security refers to the "process of achieving data confidentiality, integrity and availability by implementing controls such as authentication, authorisation, input validation and data protection." (Sarrab et al., 2016: 106). In essence, the developers should ensure the protection of data and the users of systems. Security also pertains to sensitive and confidential information, which should receive attention because "student details, grades and exams, should be protected and correctly recovered" (Sarrab, Elbasir & Alnaeli, 2016: 104). This requires that developers should ensure that the systems can protect information and data from unauthorised users (Little, 2013). In this study, VocUp did not contain compromising and confidential data since it did not involve student marks or bank accounts. Nevertheless, one area of concern was that VocUp was downloaded through a link to a website where the app code was stored. Putting VocUp on the app store might mitigate apprehensions regarding safety because failure to pay attention to protection and security may hinder the adoption and use of applications.

This particular study provided instances where the benefits of VocUp were missed because of reservations related to downloading an unknown app that had the potential of containing malware. While repeated affirmations of safety were somewhat helpful, a certain level of trepidation remained, which also contributed to WhatsApp preferences.

4.5 Conclusion

This Chapter detailed the steps in conceptualising, planning, developing and evaluating VocUp as an intervention for vocabulary development. The Chapter drew attention to the importance of balancing the pedagogic principles for vocabulary development with the technological quality requirements for the app. The importance of paying attention to pedagogy as part of the design and development of apps as interventions was illustrated. Issues such as security and safety in mlearning as well as reliability of systems were emphasised as potential hindrances and deterrents to mlearning. It seems that devices and systems are the first port of call in language interventions and, if not properly attended to, they can hamper even the most well-developed mlearning programmes.

CHAPTER 5: RESEARCH DESIGN AND METHODOLOGY

5.1 Introduction

This Chapter details the methodological aspects of this thesis as a response to the research questions. The Chapter begins with detailing pragmatism as the paradigm through which this study is viewed. It then proceeds to discuss DBR as the methodology chosen to respond to the research questions in line with the research paradigm and theoretical framework. The data collection instruments are then presented as well as in-depth details on data collection and analysis procedures, based on the three iterative cycles of the intervention implementation. It should be stated at this juncture that the lengthy nature of this chapter is based on the precepts of DBR which require that the researcher should take care to systematically document all the steps taken in data collection and analysis (Plomp & Nieveen, 2010).

5.2 Research design

A research design is the "overall plan for obtaining answers to the questions being studied and for handling some of the difficulties encountered during the research process" (Polit & Beck 2004: 49). Polit and Beck (2004) as well as LoBiondo-Wood and Haber (1998) indicated that selecting a good research design should be dominated by the consideration of whether the design is suitable for providing reliable answers to the research questions. Based on the research questions in this study, it pursued an empirical type of study based on primary data. As Babbie and Mouton (2001), have noted, an empirical study seeks to address a real-life problem.

In this chapter, possible research frameworks for this study are explored and DBR is justified as the most suitable methodology. The ontology and epistemology framing of this study are presented in relation to their suitability for DBR. The background, characteristics as well as criticisms and challenges of DBR are described to further illustrate its appropriateness for this study. In the end, the framework for this study in the form of the four-phase DBR is introduced.

5.2.1 Research paradigm

Because the context of this study is distance education (DE), it might have been presumed that it would follow an interpretivist approach, which is the most common type of research in distance education according to Szabo and Rourke (2002). Not only is interpretivism the

paradigm mostly associated with DE, it is also “the lens most frequently influencing the choice of qualitative methods” (Trauth, 2001: 7). While it is true that interpretivism is often the paradigm of choice for qualitative studies, such as this one, current research shows that there exist germane alternatives for qualitative studies (Goldkuhl, 2012). This study, thus, relied on the paradigm of pragmatism in order to respond to the research questions. Because pragmatism has the capacity to solve human problems (Rorty, 1989; Stich, 1990), it was suitable for this study as it sought ways of enhancing students’ vocabulary amidst the geographical distance immanent in DE.

The notion of problem-solving is echoed by Powell (2001) who states, “to a pragmatist, the mandate of science is not to find truth or reality, the existence of which are perpetually in dispute, but to facilitate human problem-solving.” (2001: 884). In the path of problem-solving, thus, “the essence of a pragmatist ontology is actions and change” (Goldkuhl, 2012: 7). The ontology of pragmatism, therefore, is the practical effect of ideas (Anderson, 2016). Anderson further points out that the pragmatist epistemology is governed by the view that any way of thinking that leads to pragmatic solutions is useful and that this is realised through a methodology that involves action in the form of an intervention, such as the DBR in this study. In discussing pragmatism, Goldkuhl (2012) further explores the role of knowledge as well as of the researcher, over and above ontology and empirical focus. Table 5.1 is adapted from Goldkuhl (2012), with the addition of how the aspects of the paradigm were realised in this study.

Table 5.1: The pragmatism paradigm

	Pragmatism	**This study**
Ontology	Symbolic realism	Vocabulary learning in action in real-life context of ODL
Empirical focus	Actions and changes	Intervention implemented in cyclic iterations
Type of knowledge	Constructive knowledge	Providing guidelines for vocabulary interventions; demonstrating value of mlearning interventions in ODL and suggesting possibilities for mobile-based vocabulary interventions
Role of knowledge	Useful for action	Mobile-based interventions are useful when they are actually tried, tested and refined Vocabulary knowledge entails form, meaning and use.
Type of investigation	Inquiry	Community of Inquiry
Data generation	Data through assessment and intervention	The intervention developed, implemented and evaluated
Role of researcher	Engaged in change	The researcher actively participated in the implementation that brought about change as it also evolved

Source: Goldkuhl (2012)

The prominence of action in pragmatism is highlighted in the methodology where Mead (1938) proposed four phases of impulse, perception, manipulation and consummation. These phases were synthesised by Goldkuhl (2007) into three phases of pre-assessment, interventive action and post-assessment. These three phases are intimately related to the DBR's four phases as a methodology in this study. They include the preliminary stage where the problem is analysed through the literature review; the prototyping stage which involves the phases of the development of the solution as well as the iterations of cycles of implementation; and finally the reflection phase which includes the production of design principles. Pragmatism, in sum, was chosen because of the nature of this study, which requires an action for solving a problem.

5.3 Methodology

5.3.1 Possible methodologies

This study was aimed at investigating ways of supporting vocabulary teaching and learning through newly-developed and existing mobile applications. In order to respond to the aim and objectives of this study, a number of research methods were considered as possibilities, including the case study, action research and formative evaluation.

The case study was thought to be a possible methodology for this study because it is defined as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context" (Yin, 1984: 23). Because the present study explored how the participants experienced the intervention as they used it in real life contexts, the case study was considered as a potential methodology. Another reason that prompted the case study as a possibility was the fact that the research would focus on a group of participants who give insight into mlearning in ODL, about which not much is yet known (Shank, 2006). Finally, the research objectives could have been responded to by the case study because according to Yin (1994), case studies are the preferred strategy for addressing the "why" and "how" questions: this is why every detail matters when one collects data, and "no statement escapes scrutiny" (Bogdan & Biklen, 2007: 6). The case study, therefore, would have answered how the participants experienced their using the mobile application and would have answered the query why they would have reacted, in whichever manner. Had the case study been used, though, the study would have been incomplete, as it would have focused on the experiences of the participants without considering the design of the intervention. Secondly, the case study does not emphasise the refinement of the intervention for learning purposes. Thirdly, perhaps most crucially, the case study is not aligned to the ontology and epistemology of this study since it does not particularly highlight the action, intervention and constructive knowledge associated with pragmatism (Goldkuhl, 2012) which is the focus of this study.

Another possible methodology, which is closer to the centre of this study, is evaluation research, which is closely related to the action and intervention viewpoint of the pragmatic approach to DBR (Bielaczyc & Collins, 2007). According to Babbie and Mouton (2001), evaluation studies can be judgmental-oriented, improvement-oriented and knowledge-oriented. In other words, evaluations could judge the accomplishments, effectiveness, or

lack thereof of interventions; or evaluate the latter to inform improvements to a programme or evaluate interventions in order to generate knowledge about a programme or intervention. Since evaluations are said to be "assessments of any coordinated set of activities directed at achieving goals." (Stufflebeam, 2001: 10), then this study could have been an evaluation of the activities that form part of the intervention. Nonetheless, the drawback of evaluation research, in relation to this study, is that it does not entail theory generation as a goal; rather, its aim is to improve the practice of design (Barab & Squire, 2004). Evaluation, therefore, is merely partially suited for this study; it does not serve the entire purpose of this project. While there are some elements of evaluation in the formative iterations of the study, they do not provide the full picture. Over and above evaluation, the design is not accounted for, nor is the theory building. Formative evaluation, thus, is employed as part of the methodology under the umbrella of DBR (Nieveen, 2007; Wang & Hannafin, 2005) used in order to guide the iterative phases (Kelly, Baek, Lesh & Bannan-Ritland, 2008).

The final consideration, which is also closely related to DBR, is action research: this is a systematic process of inquiry which is conducted mainly by practitioners for the purposes of understanding and improving one's practice (Hendricks, 2013; Mills, 2003). Since I am a practitioner who wanted to understand and enhance a vocabulary learning intervention for the benefit of the students, action research could have been used, particularly as it connects theory to practice (Bielaczyc & Collins, 2007). Because interventions are there to solve realistic problems, and thus, improve educational practices in local teaching and learning settings (Cohen, Manion, & Morrison, 2007), action research would have worked in this study which involves implementation of interventions. Instead of using action research, however, DBR was chosen because it goes beyond refining an intervention through iteration cycles, for improving practice as action research, since it also refines theory while providing design principles for testing and use in practice (Bielaczyc & Collins, 2007). While there have been debates on whether DBR is the same as action research (Järvinen, 2005), its focus on design, refining design principles as well as theory, largely distinguish DBR from action research.

5.3.2 DBR as a research method

This study ultimately relied on DBR as a research methodology, which is discussed in the following section. DBR is defined as "a series of approaches, with the intent of producing new theories, artifacts, and practices that account for and potentially impact learning and teaching in naturalistic settings" (Barab & Squire, 2004: 2). It was deemed best suited for this study in three ways related to the research objectives and theoretical framework for this study as well as the research paradigm. The research objectives, according to Crotty (2003), determine the methodology and since this study set out to design and implement a mobile-based vocabulary intervention, it required a methodology that would acquiesce with a process of design, development and implementation. The Community of Inquiry (CoI) theoretical framework that is used in this study points towards DBR in that it focuses on inquiry whose key element is the creation of knowledge with a focus on change and improvement (Goldkuhl, 2012). Finally, DBR is linked to the research paradigm in this study; as Confrey (2006) states, pragmatism is more related to DBR than to experimental research because it places theory in the real world of action and experience.

The terms "design research" (Oha & Reeves, 2010), "development research" (Conceição, Sherry, & Gibson, 2004) and "design experiments" (Brown, 1992) have been used in literature to describe the DBR methodology. For this study DBR was selected as employed by the Design-Based Research Collective (2003) as well as Anderson and Shattuck, 2012). DBR originated in computer- or technology-based environments (Bielaczyc & Collins, 2007) in relation to technological interventions. On the surface, DBR bridges the gap between research and practice in education (Somekh, 1995), but in essence DBR "helps us understand the relationships among educational theory, designed artifact, and practice" (Design-Based Research Collective, 2003: 5). The relationship among theory, artefact and practice is expounded by Barab and Squire who state that DBR is a series "of approaches, with the intent of producing new theories, artifacts, and practices that account for and potentially impact learning and teaching in naturalistic settings" (2004: 2). For this study, therefore, DBR was used to understand the relationship between the mobile-based vocabulary intervention, the Community of Inquiry as well as practice in ODL. Over and above understanding these strands, DBR is concerned with refining theory.

DBR, as a methodology, is “designed by and for educators that seek to increase the impact, transfer, and translation of education research into improved practice” (Anderson & Shattuck, 2012: 16). DBR, therefore, is concerned with improving practice as well as producing new theories or refining existing ones (Barab & Squire, 2004). There are key characteristics that determine the quality of DBR studies according to Anderson and Shattuck, (2012); they describe such studies as focusing on the design and testing of a significant intervention; being situated in real educational contexts; using mixed methods; involving multiple iterations as well as involving a collaborative partnership between researchers and practitioners. The characteristics are presented below in more detail and are linked to the relevant elements of this study.

5.3.2.1 Focusing on the Design and Testing of a Significant Intervention

Because researchers address practical issues to promote fundamental understanding about design, learning, and teaching (Wang & Hannafin, 2005), this quality of DBR reflects its pragmatic nature. The pragmatic paradigm in DBR is emphasised by Abdallah and Wegerif who stress that “DBR draws on pragmatic assumptions according to which the problem of the study and the research objectives form the primary drive that guides the research process” (2014: 3). Furthermore, DBR is ideal for investigating new technology-based intervention. According to research, DBR is a valuable option to use if new interventions, innovations, and educational practices which are based on new technologies are investigated (Walker, 2006; Wang & Hannafin, 2005). Because this study investigated the new mobile-based intervention for vocabulary development, it maintained a focus on the design and testing of the intervention. It should be stressed that DBR is not constricted to the intervention as such, but is also concerned with refining both theory and practice (Collins, Joseph & Bielaczyc, 2004).

5.3.2.2 Being Situated in a Real Educational Context

The second characteristic of DBR is that it should be located in real educational contexts. DBRC (2003) relate context to how designs function in authentic settings. The assertion that “Design research is not an activity that an individual researcher can conduct in isolation from practice” (Reeves, 2006: 59), reflects the contextual nature of DBR. The connection of the research to the research environment has been highlighted by Wang and Hannafin (2005), who maintain that the contextual nature of DBR means it solves contextual problems, but

that the solutions can be applied in similar contexts. Brown (1992) also noted that "an effective intervention should be able to migrate from our experimental classroom to average classrooms operated by and for average students and teachers, supported by realistic technological and personal support" (1992: 143). In other words, the design principles in this particular study "reflect the conditions in which they operate" (Anderson & Shattuck, 2012: 17), which are Unisa-related, but they may be applicable to other ODL contexts or settings where there is implementation of mobile-based learning interventions.

5.3.2.3 Using mixed methods

The third quality aspect of DBR is that of using mixed methods. Wang and Hannafin contend that one of the most prominent qualities of DBR is its flexibility, allowing the methodology to be adjusted to suit the purposes of the research project (Wang & Hannafin, 2005). This non-rigid nature of DBR is further supported by the contention that "It is perfectly logical for researchers to select and use differing methods, selecting them as they see the need, applying their findings to a reality that is both plural and unknown" (Maxcy, 2003: 59). The flexibility of DBR is reflected in past theses (Kennedy-Clark, 2013) where DBR was a methodology where students encounter mixed pretests, and post-tests, interviews, surveys and observations (Mafumiko, 2006) or persistent observation, reflective journal and multimodal discourse analysis (Bower, 2008). In this research study, the methodology mixed virtual interviews and WhatsApp chat analysis.

5.3.2.4 Involving Multiple Iterations

The fourth quality characteristic of DBR is that it includes multiple iterations of the implementation of the prototype. DBR is iterative in nature (DBRC, 2003; Wang & Hannafin, 2005) because it is concerned with the improvement and refinement of artefacts and principles, "Design practice—whether in the manufacture of cars or of fashions—usually evolves through the creation and testing of prototypes, iterative refinement, and continuous evolution of the design, as it is tested in authentic practice" (Anderson and Shattuck, 2012: 17). The iterations ensure that DBR is grounded in real-life contexts where interventions are tried and tested as they are refined through continuous cycles of design, enactment, analysis, and redesign (Collins, 1992; DBRC, 2003). Iteration can take place in different ways such as one unit being repeated in various contexts; the intervention being administered over multiple semesters; the same group of participants engaging in various versions of the

prototype or the same material being tried and tested in various groups (Kennedy-Clark, 2013). According to Herrington, McKenney, Reeves and Oliver (2007), the iterative nature of DBR is one of the main reasons for PhD students to shy away from DBR as a methodology owing to the time, and often funding, constraints. However, Abdallah and Wegerif (2014) as well as Herrington et al. (2007) have argued and demonstrated that with proper planning, DBR is flexible enough for PhD students to adapt it to suit their research needs and contexts. In this study, iteration took the form of different versions of the intervention being refined and implemented with the same group of participants for three and a half months.

5.3.2.5 Involving a Collaborative Partnership between Researchers and Practitioners

The final distinguishing quality of DBR is that it is collaborative in nature as it stresses collaboration among participants and researchers throughout the research processes (Cobb, Confrey, diSessa, Lehrer & Schauble, 2003). Because DBR is concerned with solutions to complex problems in real-life contexts, researchers have argued for the necessity of researchers and practitioner collaboration (Schwartz, Lin, Brophy, & Bransford, 1999; van den Akker, 1999). Lack of collaboration could lead to a situation where teachers are content that researchers have thought and teachers have taught (Quigley, 2000) without any consultation or agreement. According to Herrington et al., (2007) the requirement that "design-based research should address complex problems in real contexts in close collaboration with practitioners may appear to be such a long-term and intensive approach to educational inquiry" that most doctoral students would not use DBR as a methodology for their studies. It should be noted that this was one of the challenges offered by DBR for this project even though it was an ideally suitable methodology in all other aspects. A closer look at the reasons behind the emphasised collaboration, however, provided justification for the use of DBR in this study. It is argued that the partnership in DBR "recognizes that teachers are usually too busy and often ill-trained to conduct rigorous research" while "the researcher often is not knowledgeable of the complexities of the culture, technology, objectives, and politics of an operating educational system to effectively create and measure the impact of an intervention." (Anderson & Shattuck, 2012: 17).

The relationship between practitioners and researchers is complementary: on the one hand, the teacher's lack of time, funding and theoretical expertise is mitigated by the researcher, while the lack of knowledge of the real and practical complexities of the research context on

the part of the researcher is allayed by the teacher. He or she has lived experiences of the problem and will have to apply the mooted solutions.

As a solo investigator, being a researcher who has the theoretical expertise and training, I was also the practitioner who possesses intimate knowledge and experience of the environment; nevertheless, measures had to be taken towards ensuring rigour in this research. The study was consequently subjected to the "scrutiny of experts" (Kennedy-Clark, 2013: 28). The expert groups were a response to a proposal that "it is necessary for HDR students to implement checkpoints during the process to ensure that objectivity is maintained" (Kennedy-Clark, 2013: 26) in the form of feedback from experts and peers. The checkpoints for this study were a pseudo-collaborative initiative towards adjusting DBR for this study, and they spanned its duration from intervention activities to the analysis of data. These initiatives were based on recommendations by Herrington et al. (2007) who acknowledge the point already mentioned: that while collaboration is ideal, it is not always feasible particularly for doctoral studies with the limited time, funding and ethical implications.

At the beginning of the study, the theoretical expertise of the supervisors regarding theoretical framework and instruments for the study was relied upon. In developing the instruction activities for the intervention, I collaborated with a teaching colleague with whom I also tested and rated the exercises in a similar manner to the actions taken by Mor (2010). In the development of the vocabulary app, I collaborated with an app developer who brought in the necessary technical expertise. During data analysis, collaboration was undertaken with colleagues in the different stages of thematic analysis where the labels for themes were confirmed. During the study, the developments in the research were presented at doctoral consortiums and student seminars where experts contributed to design, theoretical or data related refinement areas. This research was also presented as a conference paper where comments from participants were used as checkpoints. Finally, the preliminary findings of this study were accepted for publication after intensive feedback from peer reviewers. In sum, DBR is certainly a flexible and contextual methodology that is "highly dependent on the particular context, nature, and objectives of the study" (Abdallah & Wegerif, 2014: 15).

5.3.2.6 The four-phase DBR

The first phase of DBR is composed of the identification and analysis of a practical problem (Amiel & Reeves, 2008) through a collaboration of researchers and practitioners and/ or by means of the literature review (Reeves, 2006). The first phase of DBR in this study relied on the literature review to identify and analyse the problem. The second phase in the DBR involves the development of a solution using existing principles. It was at this stage that the intervention prototype was designed using guidelines for vocabulary learning; quality in mlearning technologies as well as ODL. The third phase was the implementations phase, which consisted of three iterative cycles of testing and refinement of the intervention in practice. The implementation stage in this study consisted of the first stage called VocUp only; the second stage was termed WhatsApp only while the third stage was called VocUp with WhatsApp (V → W → V+W). The data in the iteration stages was analysed and used to refine subsequent steps of iteration because according to Wang and Hannafin (2005) data in a design-based research study are analysed immediately, continuously and retrospectively. The final phase of this study involved reflection on the study through a presentation of design principles and enhanced intervention.

5.4 Methodology processes

This methodology section details how DBR was used to weave together research and practice while responding to the following research objectives:

1 To examine how students engage with newly developed and existing mobile applications.

1.1 To examine how vocabulary learning is enhanced through a newly designed vocabulary app – VocUp.

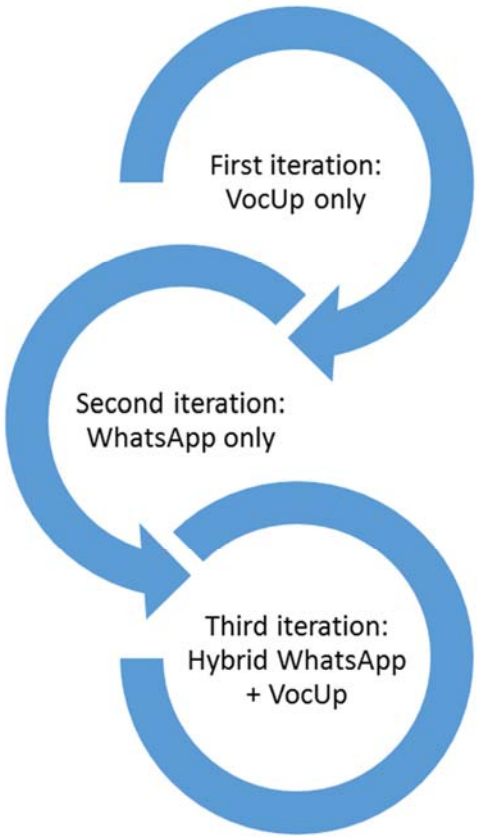
1.2 To examine how vocabulary learning is enhanced through an existing app – WhatsApp.

1.3 To examine how vocabulary learning is enhanced through a hybrid mobile learning model – WhatsApp and VocUp.

This qualitative study used mixed research instruments, in line with the mixed methods in DBR, in order to gain an in-depth understanding (Cresswell, 2003) of the experiences of students as they learn vocabulary through mlearning technologies. The interviews were used for the first two iterations of the third phase of DBR. The instruments employed in this study were all conducted online on a dedicated mobile phone. This is an emerging type of research where the mobile phone enables it. Shapka, Domene, Khan and Yang (2016) observe that collecting data through virtual means such as interviews using the cellphone might produce

fewer words than the traditional interviews, but add that data quality was not affected. Conducting research using the cellphone meant the participants could flexibly participate in the research. The benefits for the researcher was that the data was saved on WhatsApp and could be emailed, without any transcription, for filing and analysis. This advantage not only saved time but also ensured the accuracy of collected data. The data collection and analysis in this study took place in three iterative cycles as illustrated below.

Figure 5.1: The three stages of the iteration process



5.4.1 Population and sampling

The population in this study were students who were registered for first-year modules in the Department of English Studies at Unisa at the time of the research. Initially, the study had targeted one course called Foundations in English for University Study (ENG1513). This course's main focus areas – Critical Thinking; Language Structure and Grammar; Critical Reading and Critical Writing – are aimed at equipping students with the necessary academic literacy skills to prepare them for University studies. The registration numbers for ENG1513

have ranged between 400 and 700 in the registration periods of 2014 and 2016. When the study began, though, there had been no response to the invitations sent. This challenge necessitated that invitations be distributed to a broader set of recipients who were registered for other first-year English modules.

The selection of participants in research is critical yet complicated and often causes confusion (Marshall, 1996). Getting the sampling wrong, thus, often leads to skewed results or misinterpreted findings (Babbie & Mouton, 2001). In this study, the population was envisaged to include all the students who were registered for ENG1513 to whom invitations were sent for participation in the study. Babbie and Mouton call this type of sampling "reliance on available subjects" (2001: 166). There were over 100 000 students registered at the first-year level at Unisa in 2016. Therefore, it would have been impossible to gauge all their experiences. To avoid the confounding variable of attrition, the study relied on a small sample of available students. In addition, in order to garner meaningful and in-depth data, a smaller sample allowed for interviews and chat analyses. In DBR, most often, the participants are students in the researcher's (or cooperating practitioner's) own practice (Herrington et al., 2007); hence it was just as well that I had taught mostly first-year modules.

Because ENG1513 is an online module, invitations were sent using the Announcement tool on the student LMS, myUnisa, on the ENG1513 course site. The Announcement with the invitation included an information leaflet, which explained the study and what participation would entail. The invitation was sent as a high priority, which automatically despatches notifications to the students' registered email addresses. This meant that, even if a student had not logged on to myUnisa, they would receive an email notification regarding the invitation. After two weeks without attracting any responses, the invitation was sent again under the Announcement tool of myUnisa. After a week, a post was made available on the Discussion Forum tool of myUnisa. One response was received from the invitation but the rest of the students did not respond. The ethical clearance for this study was limited to students registered for the first semester of 2016 and the time constriction necessitated a review of the sampling. After consultation with the supervisors, it was decided that the invitation should be extended to other first-year students within the Department of English Studies. Emails were subsequently despatched to the Academic Coordinators at Unisa's

regional centres, requesting the Tutors to disseminate the invitation for participation in the study in their tutorials for first-year English modules. The centres contacted were in KwaZulu-Natal; Polokwane; Mpumalanga and Gauteng. The Mpumalanga region requested for a visit to be paid to the centre during the tutorials, and the study explained to the prospective participants. The other regions could not assist, citing reasons including tutorials, which had not started, hence there were no students to invite; student unrest, which had led to the cancellation of tutorials; lack of assurance on how students would benefit from the study; while some other regions did not respond. It was later found that one regional centre had moved offices and its telephone and email services had been interrupted. The Mpumalanga regional centre, where a personal invitation had been presented, yielded one response after the coordinator suggested that he would collect the responses and courier them to the researcher so the students could focus on their tutorial for the day.

The last attempt at gathering participants within the limited timeframe involved travelling to another regional centre in Cape Town where students were attending an academic literacy workshop. The instructor allowed me personally to invite participants and explain what their participation in the study would entail. After distributing the hard copy invitations, information leaflet and consent forms to each student, I left the class and waited outside until the end of the workshop. The exercise yielded 27 signed consents for participation in the study. The two earlier participants were added so that a total of 29 participants formed part of this study. Using the cellphone numbers indicated on the consent forms, the participants' names and phone numbers were saved on the cellphone that was solely used for the research. WhatsApp can create groups from numbers saved on the device used to create the group. The participants were randomly allocated into five groups on WhatsApp by typing the names of participants, counting up to six for four times and assigning the remaining five participants to the last group. Each of the four groups, therefore, consisted of six members with the fifth group having five members. Each group was named VocabNation and the number, so the study consisted of VocabNation 1 through to VocabNation 5. VocabNation was a pun on the word nation as the groups were seen as comprising a nation of vocabulary masters, but the term was also an ode to Paul Nation who is one of the pioneers in vocabulary teaching and learning (Coxhead, 2010). Relying on available subjects,

even though the final sample was broader than initially planned, was an appropriate sampling measure for DBR study which emphasises the situatedness of DBR in local contexts (DBRC, 2003). In short, the focus on first-year participants at Unisa validated the study in that through DBR it would "assess, inform, and improve practice in at least this one (and likely other) contexts" (Anderson & Shattuck, 2012: 16).

5.4.2 Data collection instruments

5.4.2.1 Virtual Interviews

The individual interviews in this study were used as a qualitative tool to answer the how and why questions related to the research questions. Because one of the characteristics of DBR is that it is situated in real educational contexts, the participants provided insight into their use of the intervention and how it could be enhanced, and also into the improvement of practice principles. The interviewees are, thus, the primary unit of analysis (Bless, Higson-Smith & Kagee, 2006) and the researcher attempted to understand the world "from the subjects' point of view, to unfold meaning of peoples' experiences" (Kvale, 1996: 2). In focusing on the design and testing of a significant intervention (DBRC, 2003), the interviews allowed the participants to contribute to the process. The interviews were virtual because they were conducted over WhatsApp using interview techniques presented by Krathwohl (1998). They were semi-structured in that open-ended questions were sent to participants and the participants were encouraged to respond in as much detail as they wished. This study takes cognisance of the drawbacks of using virtual interviews for data collection such as that related to technology complications. Sometimes the technology required for virtual interviews requires special software installation (O'Connor & Madge, 2001) or expensive equipment, all of which might be an inconvenience that might lead to attrition. In this study, technology concerns were allayed by the use of WhatsApp, with which the participants were familiar as they had all been using the platform to connect with acquaintances prior to joining the study.

The second challenge that was envisaged pertained to lack of visual cues. According to Robson (1993), traditional face-to-face interviews rely heavily on non-verbal cues such as facial expression and body language, for the researcher to understand the context in which utterances are made and also to assist the interviewees to accept the interviewer enough to open up. Some researchers have gone as far as advising that, in order to build rapport, the

interviewer must appear, speak and behave in a way that is acceptable to the interviewees. This concern was addressed at the beginning of the study during their orientation to it. The emphasis on respect and encouragement to participate worked towards creating a conducive environment where the participants were free to express themselves. They were also given a choice as to whether they wanted to type their responses or record them as voice notes since WhatsApp allowed such options. Such capabilities of WhatsApp, including emojis, facilitated cues such as emotions of participants that could not be clearly expressed by words, but were understood clearly by, for instance, a hiding emoji or laughing emoji.

5.4.2.2 WhatsApp chat log

The second type of research instrument used was the WhatsApp chat log. WhatsApp is an app, used by more than 1, 2 billion users as of January, 2017 (statista.com) in over 180 countries (WhatsApp.com, 2017). It allows users around the world to send text messages and other types of media (such as videos, voice messages, and photographs) to their contacts (Johnston et al., 2015). Over and above sending messages between individuals, WhatsApp also allows for the creation of groups of up to 256 members. Because WhatsApp presents Instant Message (IM) chats as a series of threaded messages, the participants were able to chat in real time (O'Hara, Massimi, Harper, Rubens & Morris, 2014).

WhatsApp discussions formed part of primary data in the second and third iterations of the intervention implementation towards garnering further insight into the experiences of the participants regarding learning vocabulary through mlearning technologies. Research has established that WhatsApp groups have been used for four primary purposes including communicating with students; nurturing the social atmosphere; creating dialogue and encouraging sharing among students; and as a learning platform (Bouhnik, & Deshen, 2014). In this study, therefore, WhatsApp was used as a teaching tool where vocabulary was distributed on WhatsApp and the participants used the platform to discuss and learn from each other. While researchers have investigated the use of WhatsApp for forming groups for general discussions (Church & Oliveria, 2013; Soliman & Salem, 2014; Devi & Tevera, 2014), there is a need for research that investigates how WhatsApp is used for learning (Yeboah & Ewur, 2014). Over and above using WhatsApp for vocabulary learning, it was utilised as a research tool, as a data collection instrument. The WhatsApp chats did not need transcription as WhatsApp saves chats, which were emailed and saved in Word for analysis.

The process is detailed in the analysis of the third iteration. While WhatsApp chat logs provided insight into the participants' experiences of the vocabulary interventions, some researchers have highlighted challenges of online dialogues as being non-dialogic and non-informational (Miller, 2008; Weir, 2005). In other words, researchers have to work with a plethora of chat posts containing short phrases and emojis as sources of data on which conclusions have to be reached. This challenge is closely linked to the drawback of the subjectivity of the researcher in analysing such data. In order to augment these challenges, this study relied on the CoI as a theoretical framework to structure and guide the selection of salient themes in the data. The steps for thematic analysis also ensured that each chat log was analysed according to what was important in responding to the research questions. Finally, one should recall the context of the study, with the ODL students having limited time and being always on the move, and the medium for data collection, the cellphone, which allowed for and justified the short, yet pithy posts and responses to questions.

5.4.3 The Three Iterations

In a DBR study, "the researcher is careful to document the time, commitment, and contingencies that are involved in the creation and implementation of the intervention (Anderson & Shattuck, 2012: 16). The procedures are presented as iterations because a typical design-based research study would contain two or more cycles where, after the first implementation and evaluation, changes are made to the learning environment to further improve its ability to address the problem (Herrington et al., 2007). It should be noted here that the iterations were developmental towards the refinement of the intervention because "the purpose of such inquiry should be to improve, not to prove" (Reeves, 1999: 18). It will be noted, for example, that the first two iterations include a section on refinement in order to highlight the developmental nature of the stages. The following section, thus, presents as much detail on the data collection and analysis as possible, including, where relevant, tracing how some expectations were met or not met in the process of refining the intervention and theoretical assumptions (Sandoval & Bell, 2004).

Data collection and analysis in this study took place over three iterations of the intervention. In the first iteration, WhatsApp was used as a forum for sending announcements and discussing problems. As an illustration, WhatsApp was considered to be in the form of an assembly, if a face-face high school analogy were to be used. In some high schools, assembly

takes place every morning and provides a platform where the principal and teachers can make announcements that pertain to all learners. Assembly is also a social place for prayers and singing in some schools. This is how WhatsApp had been envisaged in the first iteration, not as a classroom, but as a meeting place for announcements and raising questions that the whole group would benefit from. The second iteration involved the use of WhatsApp as a mlearning platform for teaching and learning vocabulary. In this iteration, WhatsApp was no longer a meeting place, but a virtual classroom where vocabulary teaching and learning took place. In the third iteration, WhatsApp and VocUp were used as complementary platforms for mlearning. In short, the progression of this study saw the two mlearning platforms evolve, being refined based on the experiences of the participants.

5.4.3.1 First iteration–VocUp only

The first iteration of the intervention involved the participants using VocUp to learn vocabulary. The focus in the first iteration stage of the intervention was placed on refining the intervention's technical aspects of accessibility and usability. The two areas of focus were based on the literature review informing the main quality aspects of mlearning (Sarrab, Elbasir & Alnaeli, 2016; Parsons & Ryu, 2006) where there is emphasis on accessibility and usability. Over and above the technical aspects, the analysis concentrated on the participants' experiences of VocUp as a vocabulary learning tool. The insight provided was used to refine the technical and pedagogic aspects the app based on the vocabulary teaching principles of explicit teaching of form, meaning and use; opportunities for practice as well as assessment. These focus areas constituted the basis of the interview questions upon which these results were based.

Intervention

Having designed and piloted VocUp prior to the beginning of data collection, the app was deemed ready as an intervention when the feedback received from testers did not indicate errors with the app, its functionality and or its content in the form of 'word capsules'. It is prudent at this juncture to explain how the app was sent to the participants and how they interacted with it. After the participants had been allocated to WhatsApp groups, a message was sent to all the groups welcoming them to the study. Within the groups, a discussion was initiated on some ground rules for group behaviour including an emphasis on respect, focusing on learning as well as encouragement to participate in discussions. The participants

agreed, in the groups, that they would comply with the rules. The discussion then shifted to focus on VocUp. It was explained how VocUp works, including how it could be downloaded. When the participants indicated that they understood the explanations, a link to VocUp was sent to all the groups on WhatsApp. Some participants downloaded the app, others requesting some assistance, and they started to engage with the vocabulary immediately.

The first iteration lasted for two days between 19 and 20 May. After it was downloaded, VocUp sent the word of the day to users immediately and, subsequently, each morning. The app sent a notification to the users who clicked on the VocUp icon to access the new word. The word of the day contained different categories of the word on each screen. The main screen displayed the word of the day, including the part of speech and definition. Sliding the screen showed the three example sentences. Another slide showed the three exercises which were accessed by scrolling down. On the second day, the previous day's word was displayed in the past words screen which was accessed by sliding between screens. The participants could click on the previous word and were able to revise its categories. On the second day of the intervention, the app crashed and sent all the word capsules – all at once. This was an example of what Anderson and Shattuck (2012) argued with respect to DBR: that "Design-based interventions are rarely if ever designed and implemented perfectly" and that "there is always room for improvements in the design and subsequent evaluation (2012: 17). Much as it was frustrating for the participants and researcher, with added embarrassment for the latter, the crash pointed to a need for the improvement in the app. Another consequence of the crash was that it impacted on the methodology since it brought forward the second iteration of the intervention, which was the use of WhatsApp as a vocabulary teaching tool.

Data collection

Data were collected through individual interviews. The first interviews in this study were conducted in relation to the first iteration. A message was sent to the WhatsApp groups alerting the participants that interview questions would be sent, and earnestly requesting the participants to respond. The interview questions were sent to participants and their responses returned to the researcher on WhatsApp. The interview questions were related to the participants' experiences of downloading and using VocUp with particular references to the technical aspects of the app. The interview questions were transmitted individually to all

the participants; 18 returned their responses. From these replies, there were back and forth chats between the researcher and participants as the interviews were conducted on WhatsApp, which as noted offers a feature that allows chats to be emailed for filing.

Data Analysis

The WhatsApp interview responses were saved according to the dates on which they were conducted so as to organise the data for ease of reading. With responses as raw data, there was a need for a system of making sense of the data. Bazeley (2013) posited that qualitative data requires interpretational analysis that seeks to find constructs, themes and patterns. In a more practical approach, Merriam (1998) outlined three key steps towards qualitative data analysis. The first step involves data preparation and organization. In preparing data, the interview chats were emailed to the researcher and saved as Word documents. The font size was increased for legibility. The next step was to code the data and to reduce them into themes. For the second step, the chats were highlighted using different colours for various experiences. The positive experiences were given their own highlight colour; the negative experiences were highlighted in a different colour and lastly, the areas where the participants noted areas for improvements were also highlighted in another colour. The third step was to represent the data and answer the research questions. As part of the third step of the analysis, themes were grouped under larger themes where the negative experiences were grouped under challenges. The positive experiences were grouped under benefits. The final theme was the refinement category, which was informed by the negative and positive experiences in addition to the statements that were made directly pointing to where the participants wanted improvements on the app.

Results

The results showed benefits related to ease of use, familiarity with phone systems as well as vocabulary content. The challenges of VocUp were related to phone problems, network and connectivity issues as well as lack of familiarity with phone glitches. The main refinement areas were technical and pedagogic in nature. The details are elucidated in the Findings chapter.

5.4.3.2 Second iteration – WhatsApp only

The second iteration of the study still focused on teaching vocabulary through mlearning, but the environment was different in that the platform was no longer VocUp, but WhatsApp.

The focus of the second iteration was placed on exploring a different kind of mobile environment that inculcated more human-human interaction. The research focus in the second iteration was on using interviews to gauge the participants' experiences of learning vocabulary on WhatsApp, with a specific concentration on pedagogic as well as technical aspects. The aim of the second iteration was to contribute to the refinement of the intervention.

The intervention

This stage of the intervention lasted for a month between 21 May and 20 June. In the second iteration, there were some refinements to the intervention- the word capsules, based on the first iteration. The word of the day then included pronunciation of words sent as voice notes on WhatsApp; increased writing activities in the form of sentences and paragraphs which were generated by participants as well as student-student and student-teacher interaction. During this iteration, the researcher posted parts of the word capsule to the participants, on WhatsApp, at different intervals during the day. Earlier in the day, around five in the morning, the researcher posted the word of the day, its part of speech, the definition and example sentences. During the day, the researcher sent prompting questions and messages encouraging the participants to engage and discuss the word of the day in groups. The prompts ranged from focusing on the definitions, encouraging translations to asking participants to provide their own examples of using the word of the day. Some discussions were prompted by the participants who would ask other group members for explanations or translations of the word of the day. At the end of the day, around five in the afternoon, the researcher posted the exercises for the particular word of the day. The reason for the delayed exercises was to take advantage of the social nature of WhatsApp, to allow the participants to discuss the word of the day during the day and discuss the answers to the exercises in the evening. In this way, practice and rehearsal of vocabulary were facilitated in spaced intervals.

The participants took turns to give their answers to the exercises. The exercises prompted further discussions as the participants argued, questioned and justified answers. Different languages were used as participants made sense of the exercises. The exercises also provided opportunities for multiple exposure to vocabulary as well as rehearsal and recycling of words as past words were used in the exercises and by the participants. At the

end of each week, the participants were asked to write their own sentences and paragraphs using the words covered during the week. The first time this exercise was given, the researcher distributed a cloze test type paragraph where the participants were required to fill in the gaps using the words covered that week. Cloze tests are types of tests where certain words are removed from a portion of text for the student to fill in, so as to assess comprehension and vocabulary knowledge (Taylor, 1953).

It was noted that the two platforms, VocUp and WhatsApp, demanded differential labour on the part of the researcher, even though they focused on the same task of teaching vocabulary. VocUp, on the one hand, required work in the planning stages, for instance designing instructions for the functioning of the app, such as the alarm instructions to send a new word at seven o'clock at 24-hour intervals. WhatsApp, on the other hand, demanded day-to-day actions from the researcher who had to wake up early and send the partial word capsules; facilitate discussions during the day; set the time to send the exercises of the day and then facilitate discussions centred on the exercises. It helped that the word capsules had already been developed and piloted beforehand; what was required was to email them. These messages were accessed from the phone used for the WhatsApp investigation. The activities were copied from email and then pasted on WhatsApp.

Data collection

Similar to the first iteration, the data in the second iteration were collected through individual interviews on WhatsApp. The questions were sent to the participants individually; 11 responded to the researcher individually on WhatsApp. From the responses, there were further back and forth chats on WhatsApp as the researcher sought clarity on some of the responses and participants elaborated where needed.

Data analysis

As in the first iteration, the second one followed Merriam's (1998) three steps towards qualitative data analysis. The second step of coding and reducing data included highlighting the interviews in various colours that would distinguish the responses between negative experiences, positive experiences as well as pointers for refinement of intervention. As had been the case in the first iteration, the third step of data analysis involved grouping the negative experiences under challenges; grouping the positive experiences as benefits as well as collating refinement pointers. During the coding process data were read and reread

repeatedly, ensuring a firm understanding of the information there (Taylor & Bogdan, 1998). The coding process involved highlighting sentences and phrases that were relevant for the purpose of understanding the participants' experiences of using WhatsApp for vocabulary learning. The highlighted ideas were grouped into themes that were interrelated with this study. In the end, the themes were used to gain insight towards refining the intervention. Because the themes were based on actual recorded conversations, it was imperative that the exact phrases and sentences from the interviews were presented as part of reporting, in order to strengthen the validity of the data (Kitzinger, 1994). The data in this study were manually coded in order to facilitate a direct engagement with raw data.

Results

What emanated from this iteration was that there were benefits and challenges to using WhatsApp. These were also used as guidelines for refinements towards the third iteration. The benefits were related to ease of use, learning content, feedback, practice, and interaction. The main challenge was the lack of participation in groups while the refinement pointed to a need for additional writing tasks and a review of group interaction. The details of the results are explained in the Findings and Discussion chapter.

5.4.3.3 Third Iteration – VocUp and WhatsApp

In the third iteration, both VocUp and WhatsApp were used to refine the intervention which allowed for insight into how, when, and why educational innovations work in practice. In this instance, the process of data collection was different from the first two iterations in that it relied on WhatsApp chat analysis. Each week, the WhatsApp chat log for each VocabNation group was emailed to the researcher and saved as a Word document, which amounted to five Word documents in a folder for the raw data. Data were collected from the first chats in the study, even though the first two iterations did not focus on those initial chats because the emphasis in the first two iterations was on the interviews. As soon as the chats were saved in Word, the chats were analysed, being subjected to initial analysis steps as described in the analysis section below.

While the earlier iterations were geared for development and refinement, the final iteration in this study was more of a summative evaluation of the intervention as a whole, which led to the design of the artefact as well as the implementation principles. The intervention in the

third iteration was a combination of VocUp and WhatsApp use for the purpose of learning vocabulary.

The intervention

The intervention lasted for almost two months between 21 June and 18 August. After VocUp had been repaired, it was sent to the participants again in the form of a link; they downloaded it and used it while vocabulary lessons continued to be sent on WhatsApp. Earlier iterations had shown the value of using VocUp as an intervention and WhatsApp as a different intervention as demonstrated in the results. The third iteration merged the two platforms and gave the participants options. This iteration presented an improved VocUp where the bugs and glitches had been dealt with. VocUp was also refined in that the time of day for sending new words was revised from seven to five in the morning. The content had also been refined to remove instances where semantically related sets had been taught together (Erten & Tekin, 2008). Words such as temporal/ temporary taught together or in close proximity had pointed to the need for pedagogic refinement, which was researched and corrected. WhatsApp also benefitted from the content improvement because the same lessons and word of the day on VocUp were the same as those posted on WhatsApp. The difference between the two platforms was in the type of interaction afforded. VocUp allowed for human to non-human interaction in that it facilitated student-content and student-device interaction. WhatsApp, on the other hand, promoted student-student, student-teacher, student- content and student-device interaction. The vocabulary lessons, however, were the same. The role of the teacher (researcher) was also different in the two platforms in that the teacher was not overtly visible in the facilitation of learning on VocUp, even though she had planned the lessons and ensured that they were interactive. The teacher on VocUp had virtual presence. On WhatsApp, however, the teacher was directly present as the participants waited for her to send the lessons; the teacher facilitated most of the discussions; and the teacher assisted in pointing out incorrect answers to exercises and assisted in reaching resolutions. The students also had varying responsibilities and roles in the different platforms where on VocUp they were more self-directed with the help of VocUp interactive prompts. On WhatsApp, there was a reliance on other students and the teacher while they also provided support for peers.

Data collection

Data in the third iteration were collected from WhatsApp chat logs. Each week, the researcher emailed the chat logs for each WhatsApp group to herself. The chat logs came through as Text documents, which were converted to Word documents for ease of reading. These logs were updated each week as new logs were added. A folder named WhatsApp chats was created where the logs for groups were saved. As mentioned earlier, it was not necessary to transcribe the logs or check if they were a true reflection of what transpired in groups.

Data analysis

Analysis of data in the third iteration took a slightly different structure because it was based on both WhatsApp and VocUp; the WhatsApp chats included over a thousand posts. It is noticeable that the large amount of data and the magnitude of the complicated nature of data demanded an equally stringent form of analysis. The analysis in the third iteration followed a hybrid approach of inductive and deductive data analysis through Thematic Analysis (TA). The hybrid approach is similar to the one followed by Fereday and Muir-Cochrane (2006) who used both the data-driven inductive and theory-driven codes so as to enrich the process of data analysis. For inductive coding, the study made use of Braun and Clarke' (2006) six-step thematic analysis, as follows: become familiar with the data; generate initial code; search for themes; review themes; define and name themes and finally producing the report.

For deductive coding, the Community of Inquiry (CoI) was used as both a framework for grounding and validating the themes presented. It was also utilised as an organizational apparatus towards a coherent presentation of themes because CoI consists of "categories and indicators to define each presence and to guide the coding of transcripts" (Garrison & Arbaugh, 2007: 159). In short, CoI is employed as a theoretical foundation for analysis (Zawacki-Richter, Baecker, & Vogt, 2009) as well as a presentation template (Wicks & Sallee, 2016). The appropriateness of CoI is based on the contention that it accounts for all the major themes of successful online courses: social presence, cognitive presence and teaching presence (Anderson, 2016). From a language practitioner and researcher's perspective, this project also speaks to and informs both research and practice (Anderson, 2016). Thus,

through the CoI, mobile learning facilitated deep and meaningful learning through the three CoI presences as espoused by Anderson (2016).

Thematic analysis

Based on data collected from the third iteration, an approach making use of thematic analysis was again chosen, therefore, because it "offers an accessible and theoretically flexible approach" (Braun & Clarke, 2006: 77). According to Braun and Clarke, thematic analysis is a method for identifying, analysing and reporting patterns (themes) within data (2006: 79). It consists of six phases, as mentioned. It was important to find and apply an approach that would help mitigate the diversity, complexity and nuanced nature of qualitative approaches as observed by Holloway and Todres (2003).

Table 5.2 below summarises the thematic analysis phases as aligned with the steps taken in analysing data.

Table 5.2: Thematic analysis steps

Thematic analysis step	Activity	Researcher activity	Number of themes
a. Become familiar with the data	Transcription and finding meaning through repeated reading of the data	Read and repeatedly read through the hundreds of WhatsApp posts; interview responses as well as notes	Over 1000 posts on WhatsApp
b. Generate initial code	Finding initial coding of interesting features from raw data	Highlighted comments in different colours, with similar comments in similar colours	25 highlighted codes
c. Search for themes	Finding common themes from the initial codes	Grouped my themes in a table and looked for relationships and commonalities between the initial codes	17 themes
d. Review themes	Reduction of data and codes	Merged related themes	Seven reviewed themes

e. Define and name themes	Refining themes so they demonstrate the overall story the analysis tells	Refined the themes based on the study objectives. Subdivided themes into the CoI elements while those that did not fit in were saved	Three themes related to CoI elements Two additional elements as pertaining to this study
f. Report	Reporting is the presentation of the analysis, together with extracts from data. Reports also involves consideration of the research objectives as well as of relevant literature	Integrate findings and literature in relation to the research objectives. Used CoI to provide guidelines since it is the theoretical framework for this study	The analysis chapter

Source: Adapted from Braun and Clarke (2006)

The analysis process was not a one-off event, but it continued from initial coding to reporting as the researcher refines themes (Braun & Clarke, 2006)

a) Become familiar with the data

In becoming familiar with the data, time was taken to read and reread the data collected through WhatsApp chats as well as individual interviews. The rereading of data is espoused by Rice and Ezzy (1999). Because all data were collected through the mobile phone using WhatsApp, chats did not need transcription; the chats were emailed, formatted for readability and saved. With the hundreds of chats having been recorded, the chats for each WhatsApp group were saved as Word documents. Reading through the data, the researcher made notes using the Track Changes and New Comment features in Microsoft Word. Braun and Clarke (2006:17) assert that this first stage "provides the bedrock for the rest of the analysis". I immersed myself in the data by repeatedly reading the raw data together with the objectives of the study. Braun and Clark caution against inaccuracies and discrepancies that could transpire between audio recordings and transcriptions. They advise that researchers, at this stage, should check that their transcriptions are accurate. For this study, accuracy was guaranteed in the data because the data contained the exact records of what had transpired on WhatsApp, without any threats of loss of meaning owing to transcription errors.

b) Generate initial codes

After a thorough reading through the data, 25 initial codes were formulated. These codes were generated from the WhatsApp group chats. The process started with one WhatsApp group chat where initial codes were highlighted, as recommended by Ryan and Bernard (2003). Subsequent WhatsApp group chats were used to validate the initial codes and to add later codes. Figure 5.2 below is a screenshot of the highlighted chats in Word.

Figure 5.2: Highlighted chats

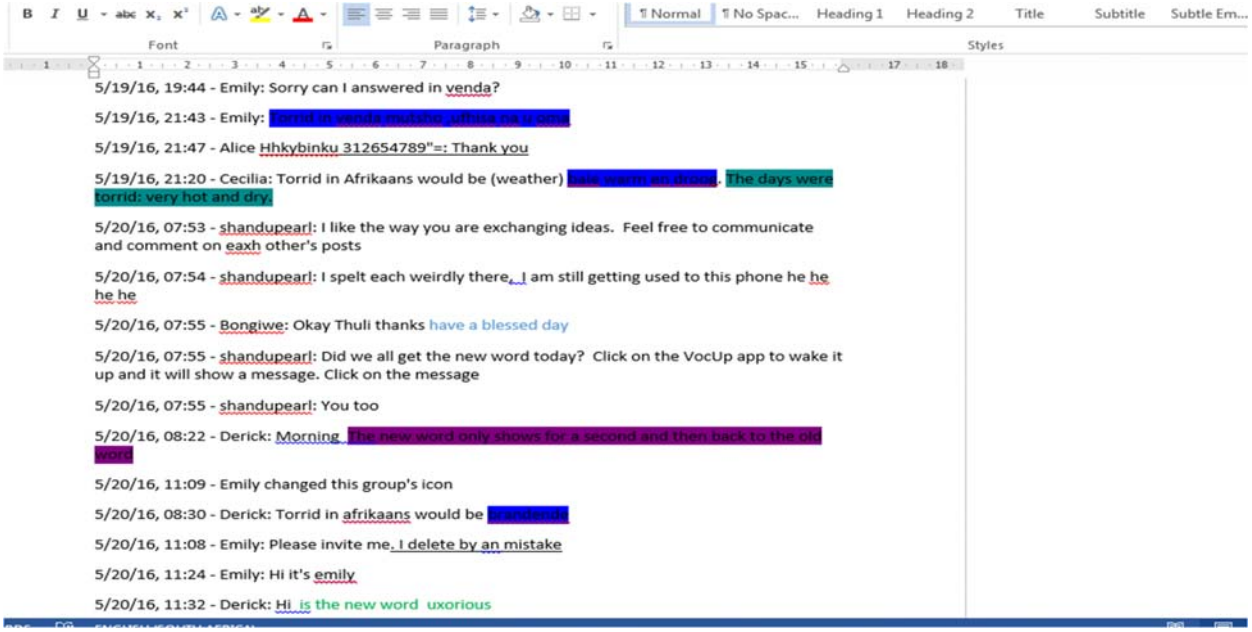


Table 5.3: Highlighted chats for WhatsApp Group 3

Code	Colour	Comments/ Actual quotations
Chat exchange/ negotiated interaction	Green font	7/18/16, 18:09 - P15: Please explain 3 7/18/16, 18:13 - P24: 1 means people of the same caliber always together. 2 something you have is better than nothing, 3 when things gets worse you must be strong.
Difficulties with the app	Purple 1	6/26/16, 19:00 - P16: On my phone gave me a problem so I could not get the app
Exercises	**Bold**	5/20/16, 09:36 - P16: Got it too but struggling exercises
Faux-pas	Underline	5/27/16, 19:23 - Instructor:
Forming a community	Orange font	7/19/16, 13:05 - P16: Good news I passed my English even though i ran out of time, I did not finish remember?

		7/19/16, 13:06 - P15: Well done! 👆 🖐 🖐 7/19/16, 13:10 - P16: Thanks P15 7/19/16, 13:11 - P15: 👆 👌 7/19/16, 13:13 - P24: Congragulations. 7/19/16, 13:14 - P16: Thanx okwam 7/19/16, 13:22 - P24: You welcome, I'm P24 … is my son on the pp.
Learning beyond/ across: Application to personal context	Purple font	6/1/16, 20:45 - P14: Same_nangesxhosa_livila_....isizulu_nesxhosa_share_some_words .
Learning new words and use	Teal	5/29/16, 22:06 - P16: I think depression can also cause stupor and post traumatic stress will let someone not function normally
Mother tongue use	Blue	6/1/16, 20:15 - P13: In Sotho mabotswa
Participating in group	Dark blue	8/12/16, 19:32 - P13: I am so glad that I was part of this group.thank you to you all.
Phone problems	**Underline and bold**	6/26/16, 19:00 - P16: On my phone gave me a problem so I could not get the app
Praising the facilitator	Red highlight	6/14/16, 09:15 - P16: Thanks sis Pearl you are so amazing yazi, I gained a lot from you
Prefer WhatsApp	-25 Grey	
Relating to the app	Pink	5/19/16, 17:26 - P16: Oh yes I did thank you
Relaxed atmosphere	Blue font	5/19/16, 11:50 - P16: Ok sisi thanx
Respecting the facilitator	Yellow	5/19/16, 11:50 - P16: Ok sisi thanx 6/9/16, 15:25 - P16: Mayor and staff, sorry sis Pearl
Self-correct (peer/ facilitator probed)	*Italics*	5/25/16, 18:46 - P14: 1a,2b,3a 5/25/16, 18:46 - P14: 2a_i_meant.
Social justice/ context/ Social reality	*Underline and italics*	6/13/16, 11:34 - P24: I think there supposed to be a centre in Khayelitsha or M/plain,
Social-emotional	Bright green	7/12/16, 09:50 - P13: You have no idea how many times I wrote this module 7/12/16, 09:51 - P24: Dont give up, I failed this module last year 2nd semester. I was writting supplementary exam now.
Time related	Dark red	5/27/16, 18:54 - P16: I didn't have time yet but I will send later, sorry for that 5/27/16, 18:55 - P25: I will send later also busy today
What to change	-50 Grey	
Wishes	Red font	
Emojis as feelings		8/12/16, 18:52 - P16: 😵😵
Strange words		5/31/16, 10:18 - P16: I will respond later am buizy for now, and I see this is interesting

From Table 5.3 above, it should be noted that there was so much highlighting to do that the highlight colours on Word ran out. To distinguish initial codes, therefore, font colours were used. Because some font colours interfered with the legibility of text, the researcher resorted to using font formatting such as underline and bold for any text relating to phone problems. The codes from the different WhatsApp group files were collated into a single file.

c) Search for themes.

During this phase, the themes had to be discovered from the codes initially identified. A theme is a "pattern in the information that at a minimum describes and organises the possible observations and at maximum interprets aspects of the phenomenon" (Boyatzis, 1998: 161). This definition is aligned with King and Horrocks (2010: 150) who define themes as "distinctive features of participants' accounts, characterising particular perceptions and/or experiences, which the researcher sees as relevant to the research question". The onus, therefore, falls on the researcher who has familiarised himself or herself with the data to make observations and judge which of the data are relevant to the research objectives. From the 25 initial codes, 17 initial themes emerged: Chat exchange/ negotiated interaction; Difficulties with the app + Relating to the app; Exercises; Faux pas; Forming a community + Relaxed atmosphere + Participating in group; Learning beyond/ across: Application to personal context; Use + Learning and using new words; Mother tongue use; Phone problems; Praising the facilitator + Respecting the facilitator; Prefer WhatsApp; Self-correct (peer and facilitator probed; Social-emotional; Time related; What to change + Wishes; Affirmation; Emojis + unfamiliar words; Personal issues: illnesses, death in family, work, money.

d) Review themes.

The themes were then reviewed through data reduction by merging similar themes. This phase required more analysis and connecting codes (Crabtree & Miller, 1999). Because qualitative data analysis is iterative (Fereday & Muir-Cochrane, 2006), each phase of data analysis is interlinked with the others and it was possible to return to the initial codes as the themes were reviewed. Through code analysis, similar codes were merged. The codes on *Respecting the facilitator* and *Commending the facilitator* were merged into a theme of *Relationship with the Facilitator*. After this, there were ten themes remaining, which included: Chat exchange/ negotiated interaction; The mobile phone is a source of benefits

and challenges; Learning vocabulary was facilitated through mlearning; Community bonds made; Personal issues; Relationship with the facilitator; Going forward. Table 5.4 illustrates the reviewed themes together with the codes they were based on. The themes are exemplified by some direct quotations from the data.

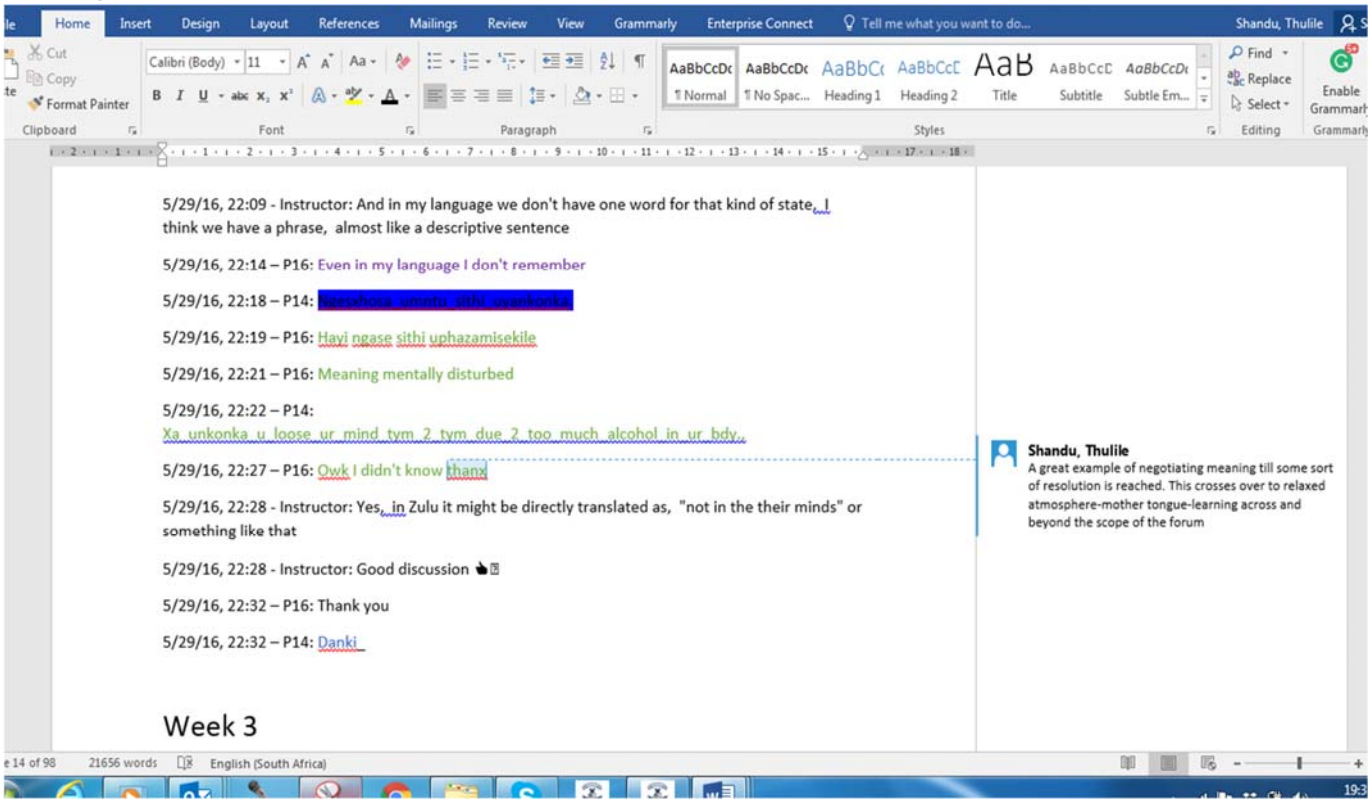
Table 5.4: Reviewed themes

Patterns	Code	Examples
Negotiated interaction Mlearning provides real-time negotiation of meaning and knowledge creation and sharing	1. Chat exchange/ negotiated interaction	6/6/16, 17:10 - P15: What are u asking? 6/6/16, 17:13 - P16: If ukuqubisana is the right word in isiXhosa? 6/6/16, 17:13 - P15: Are u sure abt your spelling? 6/6/16, 17:16 - P16: Yes 6/6/16, 17:18 - P15: Ukuqubisana,means conflict 6/6/16, 17:20 - P16: No you are wrong some times kuthiwa Orlando pirates izakuqubisana ne Kaizer chiefs kulempelaveki and that is not a fight
The mobile phone is a source of benefits and challenges	1. Difficulties with the app 2. Faux pas 3. Phone problems 4. Prefer WhatsApp 5. Relating to the app	5/19/16, 17:33 - P23 “I can't download this app ”
Learning vocabulary was facilitated through the mobile phone	1. Learning and using new words 2. Activities 3. Learning beyond the scope of taught vocabulary 4. Mother tongue use 5. Self-correct prompted by peers and facilitator 6. Recycled words and memory	5/19/16, 21:43 - P6: Torrid in venda mutsho ,ufhisa na u oma Conversation prompted by exercises
Collegial community created	1. Forming a community 2. Participating in groups 3. Relaxed atmosphere 4. Social justice 5. Social-emotional 6. Affirmation	7/19/16, 13:05 - P16: Good news I passed my English even though i ran out of time, I did not finish remember? 7/19/16, 13:06 - P15: Well done! 👆 👐 👐

	7. Emojis	
Personal issues	1. Time related 2. Finances 3. Family responsibility 4. Illness 5. Death in the family	5/31/16, 10:18 - P16: I will respond later am buizy for now, and I see this is interesting
The facilitator is not replaceable	1. Respect for the facilitator 2. Commending the facilitator 3. Past words were used in subsequent exercises and examples	6/14/16, 09:15 - P16: Thanks sis Pearl you are so amazing yazi, I gained a lot from you 7/25/16, 19:31 - Instructor: Yes, they are correct👌
Going forward	1. Wishes 2. What to change	8/18/16, 17:19 – P19: …8I wish that when we are about to write exams on certain modules we must be able to ask questions to fellow colleagues or anyone who participate in this vocab.
Real-time can be skewed	1. Flow of conversation 2. The deception of 'reality': no eye contact so use names	5/31/16, 20:02 – P26: Ubhekisa kum na. 5/31/16, 20:03 - Instructor: Yes, sorry I forgot to say 5/31/16, 20:06 – P19: What about it Thulie
Mobile phones provide real classroom flexibility	Side chats	6/10/16, 15:09 – P19: Hi Thulie,it is possible for us to ask you about ENN where we struggle?

The iterative nature of data analysis (Tobin & Begley, 2004) was adhered to in that data was constantly reviewed through reflection notes and data annotation. Figure 5.3 is a screenshot of an example of data annotation.

Figure 5.3: Annotated data

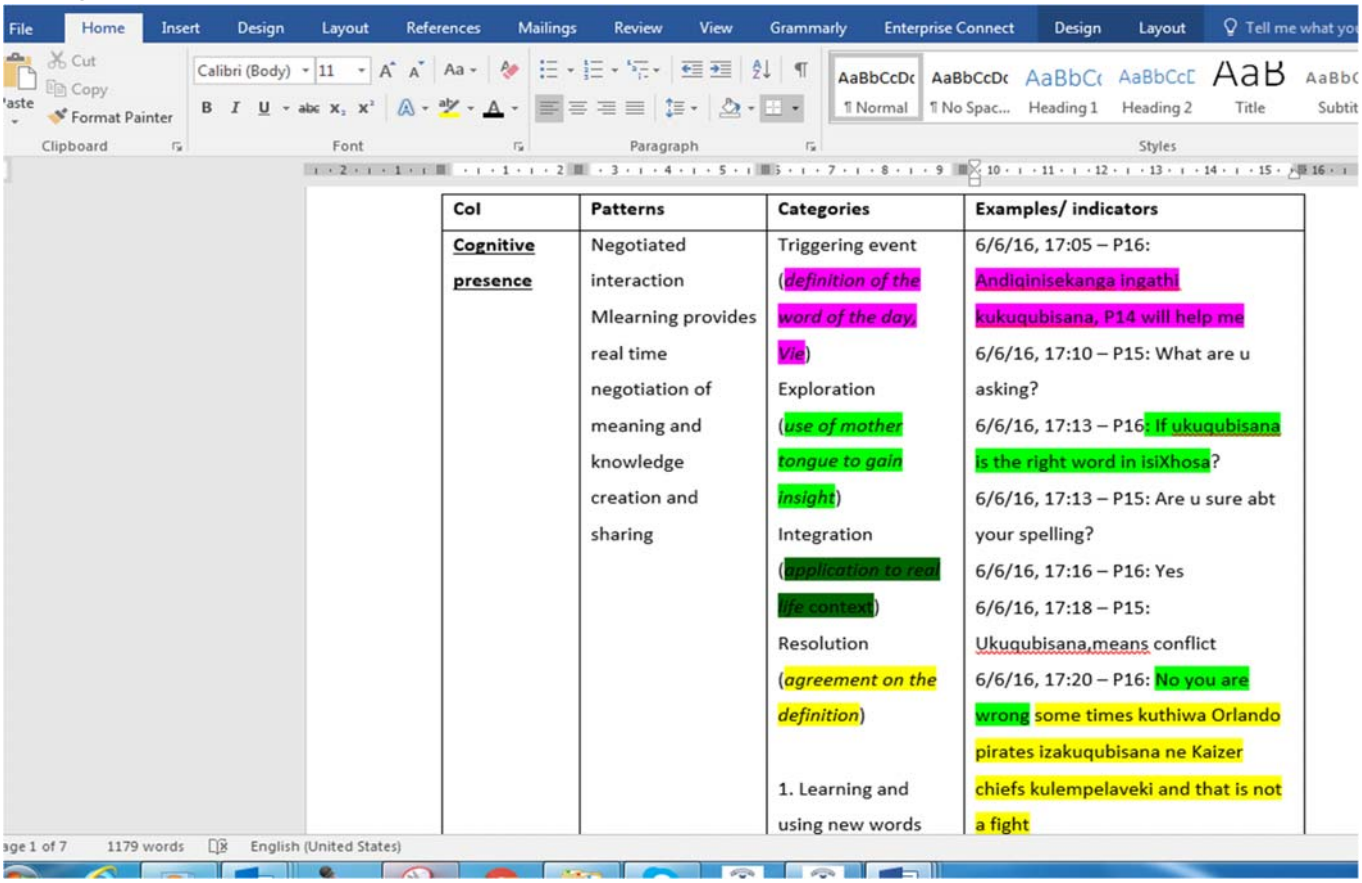


e) Define and name themes.

The themes were refined and reduced to three themes using the three elements of the CoI as a framework. Consequently, the social presence, cognitive presence and teaching presence became the main three themes representing the analysed data. The themes are identical to the CoI in that the elements are the main themes while the categories are subthemes, with the actual quotations from data used to exemplify the indicators.

Figure 5.4 is a screenshot of an example of the themes within the CoI framework, including the actual quotations as examples of indicators.

Figure 5.4: Themes within CoI



CoI	Patterns	Categories	Examples/ indicators
Cognitive presence	Negotiated interaction Mlearning provides real time negotiation of meaning and knowledge creation and sharing	Triggering event (*definition of the word of the day, Vie*) Exploration (*use of mother tongue to gain insight*) Integration (*application to real life context*) Resolution (*agreement on the definition*) 1. Learning and using new words	6/6/16, 17:05 – P16: Andiqinisekanga ingathi kukuqubisana, P14 will help me 6/6/16, 17:10 – P15: What are u asking? 6/6/16, 17:13 – P16: If ukuqubisana is the right word in isiXhosa? 6/6/16, 17:13 – P15: Are u sure abt your spelling? 6/6/16, 17:16 – P16: Yes 6/6/16, 17:18 – P15: Ukuqubisana,means conflict 6/6/16, 17:20 – P16: No you are wrong some times kuthiwa Orlando pirates izakuqubisana ne Kaizer chiefs kulempelaveki and that is not a fight

The initial themes that did not fit in within CoI were shelved as part of the discussion on CoI and how it could be tailored, specifically for ODL, the context of this study. While discarding themes that do not fit in is inherent to data analysis phases (Braun & Clarke, 2006), discarding 'irrelevant' themes remained a precarious decision since some 'non-fitting' themes remained relevant to the ODL context wherein this study was based. The themes of Learner variables; Technology matters and Planning principles became additional presences reflecting the adaptation of CoI for this study's particular context. Braun and Clarke (2006: 92) posit that each theme tells a 'story' and "it is important to consider how it fits into the broader overall 'story' that you are telling about your data, in relation to the research question". At the end of this phase, it was certain that each of the themes told a story and fitted into the broader narrative towards understanding the experiences of students in ODL as they learned vocabulary through mlearning technologies.

f) Producing the report

According to Braun and Clarke (2006), producing the report is the final stage of the analysis as the researcher writes up the 'story' told by the data, through the themes and literature, in relation to the research question. The task in this phase, they affirm, is to "tell the complicated story of your data in a way which convinces the reader of the merit and validity of your analysis" (2006: 93). In this study, the story was narrated through extracts, which richly capture, demonstrate, and exemplify issues. The reporting in this section is presented according to the themes found. The results presented were guided by the CoI framework in the Findings chapter, which follows.

5.5 Data storage

This section was included based on Easton, McComish and Greenberg's (2000) warning that it is a ubiquitous, ominous reality for postgraduate students that equipment failure and environmental conditions might seriously threaten the research undertaken. Most researchers fear the malfunction of the data collection apparatus as much as they dread losing collected data. The thought of these scenarios, coupled with the anxiety of having the collected data being unlawfully accessed, drove me to take extra care in storing data. The following steps were taken to ensure the safety and integrity of the data. Because the research and teaching took place on the mobile phone, a new phone was purchased solely for the benefit of this research study. The phone was password protected and was not used for any other purpose but the study. The emailed WhatsApp logs were sent using password protected emails and were stored only on the password-protected laptop. As a back-up to the data, the password protected email account was used.

5.6 Reliability and validity

For the research to be judged as valid and reliable, its procedures need to be placed under scrutiny. First and foremost, the strength of DBR is that it happens in real contexts, and its resulting designs are able to meet certain local needs and be useful to practitioners; thereby, the validity issue is addressed (Wang & Hannafin, 2005). The multiple methods used in DBR in general and in this study in particular construct "a body of evidence that may enhance and confirm the credibility of findings" (Wang & Hannafin, 2005: 8). This section presents steps taken to ensure the validity and reliability of the instruments and, by extension, the study.

Validity

Validity is the credibility of the findings in a study, based on the trustworthiness of the research instruments used to collect the data whereupon the findings are based (Johnson, 1997). Simply put, validity refers to how well the instruments measured what they were supposed to. Validity is increased when instruments measure "what they are intended to measure" (Buckingham & Saunders, 2004:72).

Triangulation for validity

Triangulation has been viewed as "a qualitative research strategy to test validity through the convergence of information from different sources" (Carter et al., 2014: 545). Triangulation, therefore, determines the validity of data as it "refers to the use of multiple methods or data sources in qualitative research to develop a comprehensive understanding of phenomena" (Krathwohl, 2009, 285). This study used methods of triangulation, which refers to varying methods of data collection and analysis (Arksey & Knight, 1999; Krathwohl, 1998; Polit & Beck, 2012). The multiple sources of data took the form of interviews and WhatsApp chats; these varied forms are inherent in DBR because it uses mixed methods as part of its qualities. Triangulation in this study was also achieved through the iterative cycles of the intervention implementation. Since triangulation allows information from one source to be checked against information from the other sources (Merriam, 2002), this study was able to produce results based on data that were tested against multiple sources and multiple iterations. One such example was the finding of the important role of assessment in vocabulary learning. While the interviews during the first iteration found that the participants learned from the exercises on VocUp and enjoyed their interactive features, the interviews in the second iteration also revealed participants as saying they were learning much from the exercises on WhatsApp. The same sentiments were found in the third cycle when the WhatsApp chats were analysed and the participants exchanged ideas as they worked through the exercises. Confirmation was evident, therefore, as all the iterations confirmed that the more the participants interacted with exercises, the more they were enabled to use the newly learned words.

Reliability

Reliability refers to the "consistency or stability of the scores derived from an instrument" (Johnson & Christensen, 2012: 137). In other words, if the instrument is used in replicating the study, the results should be similar. Buckingham & Saunders, (2004) maintain that reliability is achieved by using research instruments that produce the same results from the same conditions each time they are used. In working with human subjects, however, a researcher cannot achieve a hundred percent replicability. In this study, reliability was achieved through collaboration with colleagues. In analysing data, the help of two senior colleagues and one senior colleague was enlisted in the initial highlighting and coding process as well as for allocating themes into the CoI elements. While in the initial coding, I sat with the colleagues and we worked together to highlight the very first initial code, the naming of themes according to the CoI element was a different process. In allocating the themes in the CoI elements, a table was created with all the themes identified in the data analysis. I then distributed the table to colleagues, with the CoI column blank, and asked them to write in elements they thought were related to each theme. The inter-rater reliability was high in that there was an agreement in the labels the raters had used.

The four phases of a DBR study build reliability into the design by enabling checkpoints that allowed for reflecting on research with the help of the supervisors as the study progressed (Kennedy-Clarke, 2013). For example, the evaluation at each iteration allowed for a reflection on the study to check if the research was still aligned with the DBR methodology and with the research objectives.

Reliability also refers to the consistency of results when measured from varying angles; hence triangulation plays a crucial role in ensuring reliability in this study. Patton (2002: 247) argues, "triangulation strengthens a study by combining methods". In other words, the mixed methods in this study had a synergistic effect on increasing the reliability of this study.

5.7 Conclusion

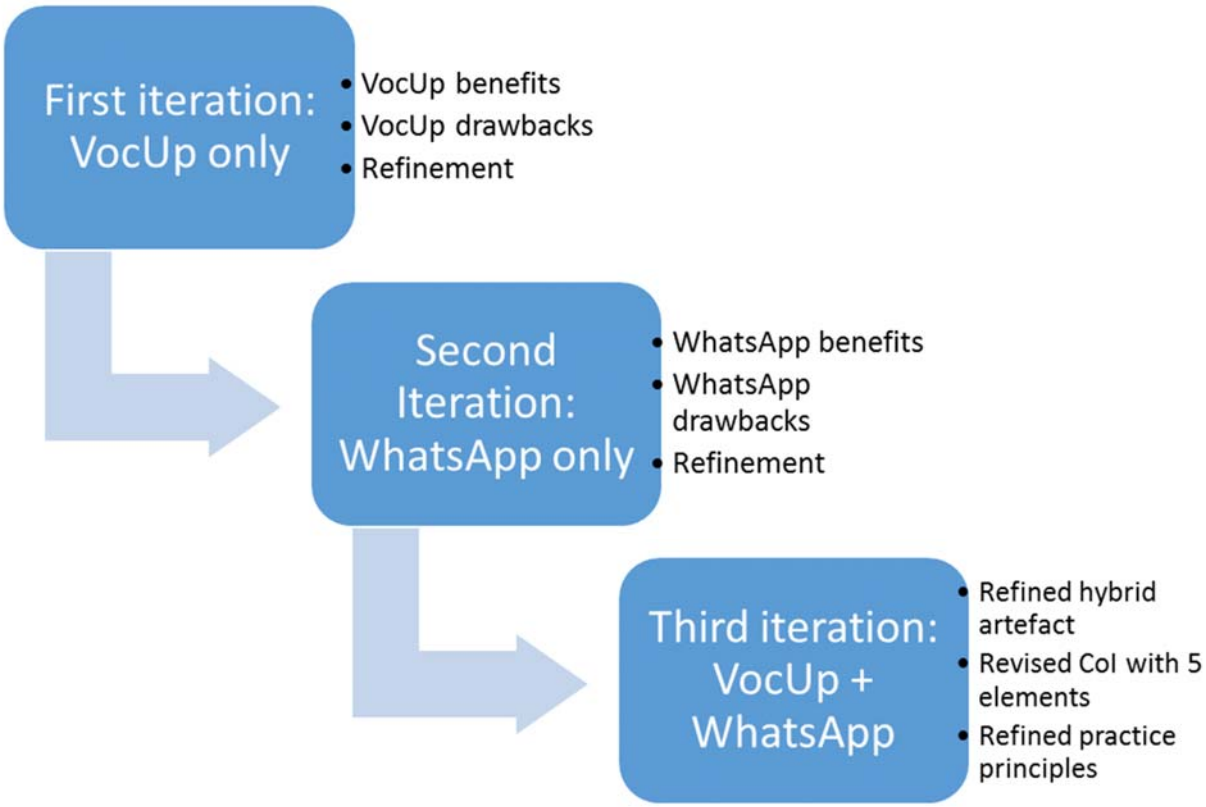
While the participants encountered both benefits and drawbacks with both VocUp and WhatsApp, the benefits of using a hybrid version on mlearning are crucial. If both WhatsApp and VocUp are made available as part of the intervention, the flexibility of mlearning and ODL is realised in that the users are given options. They are in control of their learning. In the hybrid model, the learners who prefer more human-human interaction are catered for while those who prefer independent study are also catered for. In accord with the nature of true pragmatism, where we search for solutions that work, a student can opt for both applications where they learn and do exercises in private on VocUp and then proceed to WhatsApp where they can confidently engage with group members. Secondly, a hybrid approach caters for familiarity with technology in that users can begin with what is more familiar and gradually proceed to trying the unfamiliar.

CHAPTER 6: PRESENTATION AND DISCUSSION OF FINDINGS

6.1 Introduction

This Chapter contains the findings of this study. First, discussions pertaining to the key findings are presented in subsections portraying the three iterations of this study. The first and second iterations, of VocUp only and WhatsApp only, are shown respectively as the build-up to the third iteration: of VocUp plus WhatsApp use. The findings on the hybrid WhatsApp and VocUp use are more in-depth when compared to the other, first two, iterations because this was the longest iteration and the findings are gleaned wholistically from the three iterations. Thereafter, the researcher discusses the findings in relation to the research questions.

Figure 6.1: Summary of the findings within the three iterations.



6.2 Presentation of findings

6.2.1 First iteration

Based on the virtual interviews, the following benefits and challenges of VocUp were expressed.

6.2.1.1 Benefits

Ease of use

The participants noted that VocUp was easy to download, in that they clicked on the link and the process was quick. It seemed important to them that the steps to downloading were not complicated:

> *5/29/16, 21:13 – P16: Ok thanx, Experience downloading it was very quick for me. It looked advanced off which that is good for me. according to my point of view I liked the vocup, and it was very easy for me to understand, quick to respond. As for the problem i did not have a problem about it maybe other people struggle because system of their phones are slowly to download, off which9 they need to upgrade their system.*

> *5/30/16, 12:42 – P20: Thus more appreciate to me ,download was easily because i just use the link to app.*
> *Familiarity with phone systems*

The participants who were au fait with their phones and systems were able to attend quickly to whatever was hindering the download:

> *6/1/16, 22:05 – P8: Good evening,apologies for only responding no. I found it rather easy to down load the app,after I got the settings on my phone correct*

Content

There were no reported challenges with the content of the app, but the participants reported gains and benefits. The main advantages spoke directly to the nature of the context in which the participants study. Firstly, they appreciated the fact that the app is interactive in that the exercises assist them to obtain prompt feedback on assessing their understanding of the content. In the absence of human-human interaction, the app provided device-human

interaction that facilitated feedback. Secondly, because the participants have many other responsibilities to attend to, the app's notifications helped to draw the attention of the user to engage in learning:

> *5/29/16, 23:23 – P4: Hi would like to apologise for the late reply, however I enjoyed the app and I was still learning a lot, the words a d exercises because as Unisa students there are no face to face classes where you cam intetact with others, in between test to evaluate us so this was such a plartform for us to get an overview of those things.*

> *5/29/16, 20:47 – P5: Hi the app is a good idea. Downloading was user friendly. I liked the fact that the app is user friendly and sends you a message when you receive a new word. With the exercise it allows you to check the answer. Dont like is that we stopped using the app. Just improve the glitches and the app will be great.*

6.2.1.2 Challenges

Even though VocUp was made available to all the participants, not all of them were able to access it. The reasons for the lack of accessibility were based mainly on four factors related to cellphone limitations, network limitations, familiarity as well as security.

Phone

The participants who were not able to download the app reported phone incompatibility as the main problem:

> *5/19/16, 17:37 – P23: I am using Sumsung grand Neo,and I clicked the link you sent us but bithing is happening.*
>
> *5/19/16, 17:37 – P23: Nothing is happening*
>
> *Network*

Network connections also posed a problem in that sometimes the participants were out of reach of their network providers:

> *5/29/16, 20:49 – P2: To download it was very difficult because of MTN*

Familiarity with phone systems

Sometimes it was not the phone or the network that was a challenge, but the user's familiarity with the phone systems or the process of downloading the app. While many found the process easy and quick, a few participants still encountered difficulty in downloading the app. In the excerpt below, the participant had to get help from someone more familiar with phone systems and later reported that she had downloaded the app successfully:

> *5/29/16, 20:36 – P1: Hi sorry the reason why I am quite I try downloading the app I struggled. But tomorrow I am back at work I am going to ask the I.T guy to have look at my phone than I will take it from there.*
>
> *5/30/16, 10:45 – P1: Hi cc manager to download the app it went well.*

6.2.1.3 Refinement

While the participants noted challenges and benefits of VocUp, they were also able to point to areas of improvements such as in the excerpt below:

> *5/30/16, 12:54 – P20: promble at work don't use phone most of the time, so it keep me busy. i would love to be in group for next two week's because i learn lot especially in exercises What would be nice, if this app could pronounce the words* 📢*.*

Based on the feedback in the first iteration, there were certain areas that needed refinement. Firstly, the instructions for downloading the app needed clarification so that they would be easier, even for those having difficulty with the download process. The process itself was not a problem, based on the evidence from those who were able to download the app easily and quickly; but certain users' familiarity with phone and app systems needed attention. Secondly, the suggestions of word pronunciation and more exercises had to be implemented because they were aligned with the literature on vocabulary teaching and learning. Thirdly, the call for more interaction was quite clearly based on the isolation that is characteristic of ODL. More interaction needed to be incorporated into the refinement. Finally, there were calls to continue with the app at a

point when the app had crashed; this was important for this study because the participants reinforced the need for the app.

The results were used to refine vocabulary teaching by using WhatsApp as a teaching and learning platform because the participants wanted to learn vocabulary, and WhatsApp facilitated learning while the app was being repaired. There was no reason to stop learning. WhatsApp also facilitated the second refinement, of incorporating more interaction into the learning, as the platform allowed for learner-learner and learner-teacher interaction. Finally, WhatsApp facilitated additions to the study materials in the form of the voice notes, which illustrated pronunciation opportunities.

Table 6.1: Findings on VocUp

VocUp	**CHALLENGES**
	Phone problems
	Data costs
	Security
	Familiarity with technology
	BENEFITS
	Novelty of the app
	Accessibility
	Usability
	Interaction (human-device, human-content)
	Facilitating learning
	REFINEMENT
	Clearer instructions
	Pronunciation of vocabulary

6.2.2 Second iteration

In the second iteration, the participants experienced learning vocabulary through WhatsApp. Data in the second iteration were collected from interviews, which focused on the technical as well as pedagogical aspects of learning vocabulary in the WhatsApp environment. The following findings, therefore, were used to explore the participants' experiences towards the refinement of the mobile-based vocabulary learning intervention. The findings are presented

in the form of benefits, challenges as well as the refinement of the intervention, which are illustrated by excerpts from data.

6.2.2.1 Benefits

The benefits in this iteration were mostly related to the excitement of the novelty of the intervention, ease of use as well as facilitated learning. Most participants found learning vocabulary through WhatsApp a worthwhile experience and repeatedly stated that they liked working on WhatsApp:

> *6/28/16, 18:13 – P9: 1. I like the fact that its cheap and easy accessible platform of learning new words and vocabulary*

Ease of use

The participants said it was easy to use WhatsApp. This claim was associated with the fact that the participants were used to WhatsApp for other purposes and it was simpler to use it at this juncture for learning vocabulary:

> *6/16/16, 20:56 – P19: 1.What i like the most about whatsup vocabulary is that"it is an easy way of communication,it helps us improves our english*

Content

The main benefit of using WhatsApp was related to learning vocabulary. The participants noted that they were able to learn vocabulary through WhatsApp.

> *5/29/16, 21:02 – P19: it helps me to improve my english,may be one day I will be an english teacher*

The example sentences were said to be of help, as indicated in the response to the question on what was mostly liked about WhatsApp. The exercises were also noted as being beneficial:

> *6/18/16, 09:43 – P24: How to use these words in sentences and paraghaphs*
>
> *6/22/16, 19:06 – P6: 1.I enjoyed the way you display it . you even gave us examples of de words and how to use it in the sentences.*
>
> *6/14/16, 09:13 – P3: Hi Thuli. I really enjoyed the exercises. Would really like to join one of your other groups any time. Regards*

Feedback

The participants found the feedback on WhatsApp helpful as noted in this following excerpt:

> *7/4/16, 08:11 – P3: I really appreciate your feedback. Thank you so much. Yes, you are welcome to share.*

Practice

WhatsApp provided opportunities for practising learned words in paragraphs as opposed to picking the correct sentence on VocUp. The following furnishes an example of an activity where the participants were required to create a paragraph using the words of the week. Such an activity had been modelled earlier and so the participants wrote their own paragraphs. It is important to note here that the paragraphs were sent just to the instructor and they were shared with the group only if the original author agreed. This was done in order to bolster the confidence of the participants. In this fashion, the activity was completed without anyone feeling self-conscious. None of the participants declined having their work shared with the other members. Secondly, individual attention was given to participants, especially regarding grammar improvement areas. Earlier comments in interviews revealed that some participants were initially shy and wary of sharing ideas and sentences with others. As the project continued, though, there were activities where participants created their own sentences and shared them in the group, with group members commenting on others' sentences. In this way, there was an incremental aspect to vocabulary learning and production:

> *7/3/16, 19:23 – P3: Because of her love for parties and alcohol, she was constantly revelling, leading to her inability to nurture her young baby. Her estranged husband declared her an unfit mother and approached people that previously endorsed her to state publicly that they now distance themselves from her due to her erratic behaviour. A spiritual leader took pity on her and helped her to change her ways. Her husband cautiously declared a truce when he decided to give her another chance and requested people to support her in*

stead. She saw the light and permanently changed her ways. Her child grew up to be a model citizen.

Interaction facilitated learning

Interacting with other students was said to be of benefit:

6/20/16, 10:04 – P16: Using WhatsApp vocurbulary is interesting because we also get the platform to discuss and exchanging views about our understanding of the words.

6/18/16, 09:38 – P24: I learn a lot of new words in my vocab and how to use them. The other thing I liked is exchanging ideas with other students about particular word and what it means in their mother tongue.

6.2.2.2 Challenges

While the benefits of learning vocabulary through WhatsApp were expressed, there were challenges associated with the platform. These pertained mainly to time constraints, even though there were some indications of familiarity with the technology.

Lack of participation based on work, life study

The participants noted that much as they benefited and enjoyed working on WhatsApp, they were at times unable to participate in discussions due to commitments related to work, study and personal matters. It was noted that the participants expressed regret in not participating; they felt bad about this:

6/1/16, 19:54 – P2: Instructor I am always late for my exercise in these day I am working early shifts and come back late, I will be more effective when I off "I feel bad maan"

6/16/16, 22:25 – P4: Hi am srry for the late reply. Am on my wae to eastern cape so I was bsy

5/29/16, 20:51 – P5: Pleasure. In the process of studying for my exam on Tuesday. Hence the reason for my inactiveness.

Access to words without participation

It was also found that the participants were accessing the lessons on WhatsApp. Even though they were not actively participating, they were still benefiting from the vocabulary lessons:

> *5/29/16, 20:51 – P19: To be honest I cannot say much about it,because my phone did not allow me to go to internet,so I just catch up few words the ones they discussed on whatsup.It did not work for me,bt this new one it does*

> *5/29/16, 20:54 – P1: Oh yes I do cc I write them down on my exercise book I also Google the word they are very helpful. Participation on the what up group is my weakest point* 🤓

Familiarity with technology

There was a level of apprehension about adapting to the use of WhatsApp for learning instead of the usual purpose of chatting with friends about non-educational content. This challenge did not hinder the participants from taking part, but it was not easy to get used to:

> *6/18/16, 20:28 – P7: The biggest challenge was that its my fisrt time to do vocabulary learning on WhatsApp. I use to chart with friends. I didn't know that you can learn through WhatsApp and gain more information.*

6.2.2.3 Refinement

The following refinement areas were found.

Additional writing tasks

The participants expressed that they wanted more writing activities as part of the vocabulary learning activities. Other additions that were suggested included additional exercises in the form of paragraphs and essays:

> *6/28/16, 18:13 – P9: Nothing much except when giving exercise questions,I would like if possible the questions to be at least more than 5 as it is always multiple-choice questions.*

6/20/16, 10:15 – P16: 5, You can add only the time due for the unswers, also Friday late you give us a word for weekend and that word must be unswered in a way of writing a paragraph of four lines and more. Then Monday you continue with word and those nice exercises, explanation and examples.

6/18/16, 10:01 – P7: I think you can also give a essay topic during weekend so that we can practise how to write in paragraphs. Thank you very much for helping us how to learn vocabulary words.

8/18/16, 11:44 – P13: It was easy for us on WhatsApp than the App.the only thing you could change is exemple sentences should come from us not from you,we should word harder and you help us where we struggling.that's my opinion other than that I enjoyed it and would love to be participating again.Thank you

The group interaction conundrum

While the participants lauded WhatsApp for the opportunity to exchange ideas and learn from others, there were participants who felt that sometimes group work presented challenges to learning. For one thing, the exercises were a problem in that the answers were shared, causing those who answered later not to work, as the answers were already being displayed. Another issue was that others felt apprehensive about sharing their answers, not knowing if they were correct or not. This benefit-challenge of interaction was expressed in suggestions such as the following:

6/18/16, 09:50 – P24: 5. Answers for exercise, how about people send you a private message then you come with correct answers to the group. First person who gave answers for the exercise all the other people follow her/him.

The above results, especially the last one on the group interaction issue, informed the refinement of the intervention towards the third iteration:

6/14/16, 10:26 – P12: sis Instructor please cc fix the app tjooo yesteday paper made me fill lyk going back to my high school in rural ereas to ask for a change...I felt hope less

It is necessary that sentiments expressed in the first iteration be repeated as justification for the marrying of the two platforms for the purpose of vocabulary teaching and learning:

5/29/16, 20:47 – P5: Hi the app is a good idea. Downloading was user friendly. I liked the fact that the app is user friendly and sends you a message when you receive a new word. With the exercise it allows you to check the answer. Dont like is that we stopped using the app. Just improve the glitches and the app will be great.

In refining the intervention, it became apparent that the two platforms offered benefits for the users. The refinement was observant of the benefits and challenges of WhatsApp and VocUp. It bore in mind that the participants, while still using WhatsApp, asked for VocUp to be repaired and returned; it noted the participants' request for space where they could tackle the exercises in private before discussing them with the group. In terms of all these considerations, the third iteration used WhatsApp and VocUp in a complementary manner. In summarising the first two iterations, Table 6.2 presents an overview of the benefits and challenges of WhatsApp and VocUp.

Table 6.2: The benefits, challenges and enhancement of WhatsApp

WhatsApp	**CHALLENGES**
	Internet connection
	Time restrictions
	Group participation
	BENEFITS
	Familiarity with technology
	Accessibility
	Teaching presence
	Interaction (different types)
	ENHANCEMENT
	Additional writing tasks
	Managed group interaction

6.2.3 Third iteration

Analysis of data in the third iteration took a slightly different shape because it was based on both WhatsApp and VocUp, specifically on the exchange of chats on WhatsApp. The analysis in the third iteration followed a hybrid approach of inductive and deductive data analysis through Thematic Analysis (TA). This section presents the last stage of TA, which is called *Producing the report*. As earlier mentioned, the report is subdivided into the CoI elements, categories and indicators.

6.2.3.1 Social Presence

What emerged forcefully in this study was the purposefulness of the interaction. This focus is an illustration of the symbiotic and reciprocal influence within the three elements of CoI. The social presence is focused on interaction towards cognitive development channelled through planning and facilitation in the teaching presence. Group cohesion, within social presence, refers to communication towards achieving worthwhile educational goals collaboratively (Garrison & Arbaugh, 2007). In other words, group cohesion has to "reflect the collaborative nature of the community and its activities" (Garrison, Anderson & Archer, 2010: 7). In other words, the focus in social presence shifts from a mere socio-emotional outlet to academic purpose and activities (Brown, 2003).

The seminal publication of the CoI framework at the turn of the century (Garrison, Anderson & Archer, 1999) provided a shift in online learning research that accentuated social space, not only as a socio-affective space, but also as a learning one. The social presence in CoI attempts "to understand how participants in mediated communication project themselves as 'real people', especially in the relatively lean medium of fully text-based, asynchronous communication" (Shea, Hayes, Vickers, Gozza-Cohen, Uzuner, Mehta, Valchova & Rangan, 2010: 10). Within the context of this study, learning vocabulary through mobile learning, the social presence was manifested through WhatsApp discussions, through student-student, student-content and student-teacher interaction (Moore, 1989; Makoe, 2012).

In this study, social presence highlighted an open environment where participants were able to express themselves; an environment that was a social outlet for socio-emotional issues; and a forum that fostered group cohesion for learning. These are the three categories that define the social presence: affective expression; open communication and group cohesion, respectively (Garrison & Archer, 2000; Garrison & Arbaugh, 2007).

Open communication

Using WhatsApp as an interaction tool in this study facilitated open communication within the group. Because of the participants' familiarity with WhatsApp and the clarity of instructions for interaction, the participants freely expressed their thoughts, feelings and engaged in the vocabulary activities.

- Choice of language

One of the main reasons that facilitated open communication was the freedom the participants were accorded to use their language of choice as they interacted. Although the group was engaged in learning English vocabulary, they engaged in meaningful interaction which was conducted in a free space. South Africa's former statesman and global icon, Nelson Rolihlahla Mandela, firmly stated that, if you talk to a man [sic] in a language he understands, that goes to his head. If you talk to him in his language, that goes to his heart (Nelson Mandela, cited in Ginsburgh & Weber, 2011). These words resonated throughout the study as participants repeatedly lauded the fact that they were able to express themselves and exchange ideas in their language of choice. While language choice is espoused in South Africa's constitution and effected through the Pan South African Language Board, the reality is that English usually takes centre stage, leaving little room for indigenous languages. In this vocabulary learning space, however, participants expressed themselves freely using their chosen languages.

One participant succinctly elaborated on the importance of language:

> *6/22/16, 19:26 – P6: 3.u let us use any language ,even learn the meaning in different languages.*

Using their chosen languages (which included any of the eleven official languages as well as colloquial language), the participants reassured each other, arrived at understanding the word of the day and generally communicated with each other. Translation into a learner's first language is one of the important strategies used for vocabulary learning (Schmitt, 1997). The first language plays a role in learning another language, whether at beginner or more advanced levels (Sunderman & Kroll, 2006). The data in this study highlighted the importance of the first language, as well as a language with which the participants were familiar and comfortable. Schmitt argues that there are times when the learner's mother

tongue can aid second language learning when he posits: “Although it is unfashionable in many quarters to use the L1 in second language learning, given the ubiquitous nature of L1 influence, it seems perfectly sensible to exploit it when it is to our advantage.” (2008: 337). In this study, the first language was an advantage as indicated in the following excerpts:

> *5/29/16, 21:54 – P9: NEH? (Neh is a colloquial phrase used to check if the audience agrees with the speaker. It is equivalent to, “right?”*
>
> *5/29/16, 18:45 – P19: Otlasa kgatello,ya maikutlo kapa ya jwala (Defining the word of the day, stupor, in SeSotho)*
>
> *5/19/16, 21:43 – P6: Torrid in venda mutsho ,ufhisa na u oma (Defining the word of the day, torrid, in Venda)*
>
> *5/19/16, 18:26 – P24: Torrid means xesha linzima in xhosa. Any xhosa speaking person here can correct me.*
>
> *5/23/16, 07:43 – P3: Welwillendheid of liefdadigheid in Afrikaans. (benevolence in Afrikaans.)*

This interaction illustrates that the students were also learning and improving their knowledge of the other languages spoken in South Africa. Because the group was heterogeneous, it also demonstrated the multilingualism which is the tapestry of South Africa. Secondly, this project permitted participants to speak their digital language by using WhatsApp. They used their mobile phones and interacted on the move; they utilised shortened SMS language and employed emoticons, all of which created a forum characterised by open communication.

- Self-correct

Open communication was also visible in the manner in which the participants were free to correct themselves without fear of judgment. They corrected themselves when they had chosen an incorrect option in the exercises:

> *7/4/16, 18:32 – P6: 1b*
>
> *7/4/16, 18:34 – P6: 2a*

7/4/16, 18:34 – P6: 3a

7/4/16, 18:38 – P10: 1(a),2(a)&3(c)

Nevertheless, sometimes, participants rechecked their answers (after being prompted by others or the teacher) and realised their error:

5/31/16, 20:18 – P25: I see now because I went back to check the definition again. Correct answer is 1a

7/14/16, 12:39 – P9: Lol 😂😂😂😂😂 Jah 2 is (b) was mistyped but 1 l now understand its (a)

Sometimes participants also self-corrected non-content errors. This could be related to their 'awareness' of how they portrayed themselves. While they were free to express themselves, they were somewhat mindful of their expression:

6/9/16, 19:01 - P6: Yo apology is excepted cc
6/9/16, 20:39 - P6: Is accepted.

- Encouraging and admonishing group members

Because the participants were communicating openly, they were able to encourage each other. This post demonstrates a view of working together in the group for a common goal:

5/22/16, 12:58 – P24: I encourage everyone to participate in this group so that we can help each other.

The openness also allowed group members to admonish each other when it was felt that the others were not contributing enough. There was a pronounced understanding that it is in working together that they would achieve much:

8/5/16, 08:12 - P3: Can I be candid? What happened to the other students as I see no comments? P4? P6?

8/5/16, 08:17 – P3: We have to show Thuli that we appreciate her efforts.

In the above exchange, the first indicator of openness is the P3's confidence in expressing her concern about the quietness of the group; she further mentions some of the participants by name. The response is even more telling in that it is not disdainful, but rather offers an

opportunity for an explanation that P4 did not have data earlier. This exchange is an example of how learners' personal circumstances could affect mobile learning, as will be shown later in the chapter. The last response indicates that even though group participation is important for symbiotic learning, there is also another aspect, which lingers at the back of the participants' minds: the teacher has done her part; we have to appreciate that and do our part. It will be shown later that one of the favourite attributes of this project was that there was someone who gave her time to interact with the participants.

In an ODL context, any intervention and opportunity to interact with the lecturer are valued and appreciated. It should also be noted here that 'candid' had been a word of the day previously; this affords an example of how participants learned and demonstrated their mastery of the new words. This behaviour demonstrates that there is a strong relationship between social presence and learning outcomes (Arbaugh, 2007; Arbaugh & Hwang, 2006). The more participants engage within the social presence, the more they will perform in the cognitive presence.

- Discrepancies in openness

While it is accepted that social presence is indicated in the openness of communication, the data showed discrepancies in the levels of openness. The participants openly interacted in their groups, but they sometimes inboxed me on the side with other issues. This action is attributed to the mindfulness of the participants as regards the unwritten rules of the group; even though they do not see each other, they still want to portray a positive image of themselves. Because social presence in online learning is related to how learners want to be perceived, socially and emotionally (Gunawardena & Zittle, 1997), it is understandable that the participants seemed to filter their openness when they were in the group or when they were interacting with the facilitator, individually. Whether seen in person or virtually, participants seem to acknowledge that, "all the world's a stage" (*As you like it*, by William Shakespeare) and they have to alter how they act and behave whether they are in the group or during one-on-one interaction with the teacher:

> *7/7/16, 18:22 - P3: Hi Instructor, I was wondering if you could not send a voice note with the word for us to hear the proper pronunciation? That is often a problem.*

8/18/16, 11:44 – P13: It was easy for us on WhatsApp than the App.the only thing you could change is exemple sentences should come from us not from you,we should word harder and you help us where we struggling.

In the above excerpts, the participants seem to shy away from projecting a negative image of themselves, with P3 asking for additional resources from the instructor.

The Individual attention in the conversations was also appreciated during interviews where participants were individually asked about the WhatsApp and VocUp activities. The following sentiments are presented with a preface, an appreciation for a side chat as it opens the floor for the participant to express herself freely:

5/31/16, 08:41 – P18: Hello Instructor. Thank your for writing straight to me about the app . To be honest I never tried it, l just appreciate the fact that you choose to use whatsapp to accommodate everyone after it did not worked out. I still think that whatsapp is the great idea, because some of us do not have money to download while whatsapp is affordable.

Openness, therefore, was facilitated through the medium of interaction, WhatsApp, on participants' mobile phones. They commented freely on the groups while leaving what they deemed sensitive for the teacher's attention. In a face-to-face situation, such an event would be cumbersome. Firstly, it would mean the learner waiting until the class is over to obtain some time alone with the teacher. It could also mean the learner might attract suspicious glances when the others see her or him chatting alone with the teacher. In the mobile learning realm, however, all it took was for the individuals to inbox the instructor, perhaps while they were also actively engaging in their groups. At times, the openness in social presence allowed for comments that reinforced the social nature of the group. Comments ranged from what participants liked for recreation or activities for International Nelson Mandela Day to general jesting camaraderie:

6/1/16, 17:59 – P9: 1(a),2(b)&3(c) lol l m not a movie fan 🤣🤣🤣

5/24/16, 19:41 – P4: P3😂😂*A realy u gonna kill people*

Affective expression

While social presence facilitates open communication, it is also manifested in affective expression. The participants used the forum to tackle socio-emotional issues as they interacted. One participant expressed the usefulness of the group in mitigating the loneliness inherent in distance education:

> *6/18/16, 10:03 – P24: Sometimes distant learning is very lonely and boring but when we have whtsap groups to share ideas it become easy and motivating*

The extract above draws attention to two of the most prominent challenges for the ODL student, isolation (Birch & Volkov, 2007) and motivation (Garrison & Arbaugh; 2007).

- Socio-emotional expression

The participants congratulated each other:

> *7/19/16, 13:05 – P16: Good news I passed my English even though i ran out of time, I did not finish remember?*
>
> *7/19/16, 13:06 – P15: Well done!* 👍 👏 👏
>
> *7/19/16, 13:10 – P16: Thanks P15*
>
> *7/19/16, 13:11 – P15:* 👍 🤙

They provided an emotional anchor and guided each other:

> *7/12/16, 09:47 – P24: Thanks n u how did u do*
>
> *7/12/16, 09:49 – P13: Bad and I'm about to give up now*
>
> *7/12/16, 09:49 – P24: Please don't!*
>
> *7/12/16, 09:50 – P13: You have no idea how many times I wrote this module*
>
> *7/12/16, 09:51 – P24: Dont give up, I failed this module last year 2nd semester. I was writting supplementary exam now.*

It is interesting how P24 reassures P13 by being vulnerable enough to say, they were in the same boat because he also failed the module, but persevered, and this time he has passed. In his encouragement, he is closing the gap of isolation while he motivates P13.

The participants also expressed elation when they felt it:

5/23/16, 06:31 – P10 I m inspired by these new words l am very excited to be in this group though at times l miss opportunity to answer

6/5/16, 20:17 – P19: Wow,night night

8/12/16, 19:32 – P13: I am so glad that I was part of this group.thank you to you all.

- Use of emoticons

The participants used emoticons quite plenteously. In most cases, emoticons were used to supplement text; they were also utilised almost as punctuation to highlight and emphasise ideas and feelings. As far back as the 1990's, the use of emoticons was affirmed as a way of supplementing text in online communication (Rezabek & Cochenour, 1998). These authors claimed that the use of emoticons, or verbal cues, was one way of clarifying verbal meaning and represented feeling or emotions. In those days, emoticons were formed through the combination of ordinary punctuation marks and they had to be read sideways. These days, emoticons are immediately created when one types in the said punctuation. More recently, however, emoticons are preloaded in apps such as WhatsApp. The modern day emoticons, called Emojis, are also much more advanced and varied, with WhatsApp containing categories such as sports, food, activities, clothes, animals, weather elements and moods. Research that is more recent has affirmed emojis as an agent for clarifying online messages (Kaye, Malone & Wall, 2016), especially since they close the gap regarding the lack of the non-verbal cues which are intrinsic to face-to-face communication. So popular are emojis that "the face with tears of joy" took the Oxford Dictionary's Word of the Year prize, making it the first time that a "non-word word" had won the prize (http://blog.oxforddictionaries.com). In all essence, an emoji is a word because it conveys meaning. The term is borrowed from Japanese, with *e*- meaning picture and -*moji* meaning letter. The Emoji, therefore, is a picture representing a letter, in this case, a word, sentiment or expression.

The participants, thus, used emojis to supplement and, consequently, clarify meaning in their sentences. This aspect of social presence is especially crucial for students in ODL, in particular, those who are predominantly non-native speakers of the language of learning and interaction, English. Emojis, therefore, were used as part of the communication strategies utilised by the participants in supporting phrases (Dörnyei & Scott, 1997). In face-to-face

communication, we often need a non-verbal nod to convey agreement, acknowledgement, or even submission, depending on the expression. Communication strategies are used to help convey an intended meaning and include paraphrasing, substitution, coining new words (based on pronunciation), switching to the first language and asking for clarification. In this project emojis were a convenient, timesaving tool in the light of the physical distance, which limited face-to-face non-verbal cues, as well as the linguistic distance attributed to non-native users trying to communicate in a group. The ability and willingness of the teacher, in this study, to use emojis ensured that teacher and participants spoke the same language and facilitated ease of communication:

> *6/6/16, 17:29 – P16: That is a clash lol I am right* 🏃 👣😂😂😊
>
> *7/25/16, 18:02 - Instructor: I see there is a general agreement on the answers*☺
>
> *7/19/16, 20:03 – P17:* 🤾

Group cohesion

The most pertinent statement regarding social presence is made by Garrison and Arbaugh who affirm, "Although socio-emotional communication may be important, it is not sufficient for educational purposes." (2007: 161). This statement encapsulates the concept of language learners in ODL, specifically within the realm of mobile learning. While the participants in this study did effectively use mobile devices to encourage each other and engage with each other, their interaction went beyond that of serving socio-emotional needs. The participants in this study seemed to acknowledge that interaction goes far beyond making friends, but that they needed other group members with whom to exchange ideas and learn together while helping each other to understand certain concepts. In the following exchange, the participants were answering exercises related to the word of the day. The options for the question required an understanding of certain English proverbs. The participants helped each other where they needed it:

> *7/18/16, 18:09 – P15: Please explain 3*

7/18/16, 18:13 – P24: 1 means people of the same caliber always together. 2 something you have is better than nothing, 3 when things gets worse you must be strong.

The participants used their indigenous languages and corrected each other as they interacted towards building understanding. Such learning through interaction was also manifested in intersubjective modality, which, according to Anagnostopoulos, Basmadjian, and McCrory's (2005) takes place in online learning when a participant directly refers to another participant's post in his or her own post as they connect, while they are creating knowledge together in the online environment:

6/6/16, 17:05 – P16: Andiqinisekanga ingathi kukuqubisana, P14 will help me
6/6/16, 17:10 – P15: What are u asking?
6/6/16, 17:13 – P16: If ukuqubisana is the right word in isiXhosa?
6/6/16, 17:13 – P15: Are u sure abt your spelling?
6/6/16, 17:16 – P16: Yes
6/6/16, 17:18 – P15: Ukuqubisana,means conflict
6/6/16, 17:20 – P16: No you are wrong some times kuthiwa Orlando pirates izakuqubisana ne Kaizer chiefs kulempelaveki and that is not a fight
6/6/16, 17:21 – P15: They will meet,it's a clash

Social presence, thus, is multidimensional because it reflects online groups' open communication, affective expression as well as group cohesion. Inasmuch as the participants in this group did portray themselves as real people when they used the group as a socio-emotional outlet, group cohesion was evident as the participants mostly interacted for learning purposes while they constructed knowledge and understanding in groups. While a sense of belonging is important, especially in the mostly isolated ODL context, social presence creates personal, yet purposeful, relationships. Although it has been shown that over time, affective and open communication decreased as group cohesion increased (Vaughan & Garrison, 2006), the ODL setting allowed for participants to intersperse even the most advanced group cohesion stages with personal posts relating to personal wellness, personal achievements and personal concerns, such as not being able to participate in discussions due to work commitments. What is distinct and essential about social presence

is the shift from it being viewed as “a social space for making friends, while it is facilitating cognitive presence through the teaching presence. Social presence is not there for purely social reasons” (Garrison, 2007: 159); instead, people are socialised purposefully towards cognitive development.

6.2.3.2 Cognitive presence

It is important to note that discourse, in this context, is not merely a conversational exchange, but is an expression of reflection and learning (Garrison, 2016). In short, cognitive presence explores how a community of learners negotiate and confirm meaning through interaction. The latter is not limited to the group of students but includes interaction between students and the teacher. The data in this study provided instances of negotiated interaction among the students as well as between the students and the teacher. Cognitive presence involves four subcategories which reflect the development of the negotiation from a mere exchange of ideas to a meaningful building and confirmation of knowledge within the community. The four stages develop from a triggering event to exploration, then integration and, finally, resolution. It is crucial that, through conversation, students should progress beyond exchanging ideas in order that they can achieve exploration, integration and ultimately, resolution (Celentin, 2007).

The cognitive presence should ideally culminate in critical thinking, which, according to Garrison and Arbaugh (2007: 161), is “a distinguishing characteristic of higher education”. If students in higher education are to develop into academically sound scholars, they need to develop as critical thinkers. The data in this study showed two kinds of cognitive presence: 1) among students and 2) between student and teacher.

The indicators of the cognitive presence are conspicuously demonstrated in the progression from a sense of puzzlement to information exchange, subsequently to connecting ideas and finally, to applying new knowledge. Two instances were chosen to exemplify the teacher-student interaction as well as the student-student interaction.

The best lens through which to view the cognitive presence between teacher and student is Moore’s (1989), who defined this type of interaction as an attempt “to motivate and stimulate the learner [which] allows for clarification of any misunderstanding by the learner in regard to the content” (1989: 2). What follows is an analysis of a conversation; the focus

will be placed on how a triggering event was developed until it reached a resolution through motivation, stimulation and clarification of misunderstandings.

Triggering event

The first phase in the cognitive presence is the triggering event, which, according to Garrison and Arbaugh, occurs "where some issue or problem is identified for further inquiry" (2007: 161). One such event led to a discussion that only reached a resolution after four hours. It should be noted that this resolution arrived after a thread of over 62 posts between learner and students and occasional posts from other students. Although the number of posts is not typical of the daily topics in the project, this thread was chosen as it provided a detailed progression from the 'puzzled' stage to the 'application of knowledge' stage. The triggering event emanated from the definition and examples of the word of the day, 'temporal'. It will become evident later that the link between the presences in general and the teaching and cognitive presences, in this particular instance, is inherent in the CoI.

After defining the word of the day and providing the three example sentences, the first response of the day came through:

> *5/31/16, 09:15 - P14:*
> *Actually_the_definition_of_this_word_confuses_me..can_it_be_more_clear_(i_do_not_understand_it_:space_nd_tym?its_not_clear_2_me_.)*

Please note that this participant's phone was giving him problems with the keypad. This hurdle did not stop him from participating fully in the project and benefiting from it.

The above post shows a sense of puzzlement; he used the words, '*confused*' and '*do not understand*'. The student proceeded to refer to the exact trigger, in this case, the definition and the use of the words, space and time. To the student, the definition made it difficult for him to grasp the concept of temporality clearly. A closer analysis of the discussion revealed that the 'space and time' he was referring to was a phrase in one of the example sentences:

> *"Unisa students are separated by time and space, in other words, the students face temporal and spatial distance from each other."*

In this instance, the instructor's example triggered the sense of puzzlement which demanded further enquiry.

Exploration

What followed the triggering event was exploration or the exchange of ideas, "where students explore the issue, both individually and corporately through critical reflection and discourse" (Garrison & Arbaugh, 2007: 161). In this instance, Moore's (1989) learner-instructor interaction was evident as instructor and learner and included motivation, stimulation and clarification of misunderstandings. As mentioned earlier, there were over 60 posts, mainly between the instructor and learner, as they attempted to clarify the misunderstandings:

> *5/31/16, 09:56 - Instructor: Alright P14, what do you understand from the definition, leave the examples for now. In your own words, even in your first language. What do you understand by temporal based on the definition? Anyone else from the group can jump in*
>
> *5/31/16, 10:00 – P14:*
> *Related_2_time_it_is_said_but_i_dnt_knw_hw....myb_if_it_can_be_specific_nd_more_simpler_because_the_examples_used_have_words_that_need_2_be_define_also_words_such_as_spatial,*

It seemed that the more explanations were provided, the more 'sub-triggering' events emerged. This comment resonated with the non-linearity of the phases within the cognitive presence: one does not automatically progress to the next step. Sometimes a participant might regress to or repeat past steps as they move closer towards resolution (Swan, Garrison & Richardson, 2009). After 20 years of teaching English in various contexts including Adult Basic Education, High School, undergraduate and postgraduate levels, I had never been told that my teaching was confusing. This was taken as a challenge to guide the student towards understanding, but it was evident that he wanted to be provided with a 'clearer' definition. Researchers such as Laufer and Yano (2001) have researched students' difficulty with understanding some words; they posit that when students do not understand a word they either ignore that word, look it up from a dictionary or infer the meaning from the

context. Even after prompting from the instructor, the student still sought an answer from the perceived authority figure. This was a crucial finding in that in ODL, where students have limited time owing to other daily activities, anything that demands even more from the little time they have is perceived as an extra demand. One of the participants commented, during this conversation:

> *5/31/16, 10:18 – P16: I will respond later am buizy for now, and I see this is interesting*

It is not that this participant did not want to participate, she was engaged in some other activity, but she acknowledged that she was paying attention. In the same way, P14 could have looked up the word in a dictionary, or worked out the meaning from the context, but he might have thought it was easier and more convenient to request an answer from the teacher. In revising VocUp, the link to the online dictionary was added as a quick reference tool in order to lessen the perceived extra burden of leaving the app to search for added definitions.

Integration

As the conversation thread continued, integration was evident. This stage reveals the true interrelated nature of the CoI, in that integration benefits from teaching. Garrison et al. (2001) posit that this stage requires a greater and enriched teaching presence so as to guide students towards higher critical thinking, which will ultimately lead to resolution.

This stage required the instructor to dig deep into her teaching and facilitation skills and knowledge of the English language:

> *5/31/16, 10:19 - Instructor: Working as a waiter while you study to become a lawyer is temporary*

To which P14 replied:

> *5/31/16, 10:19 – P14:*
> *People_r_taken_out_4rm_shacks_nd_the_land_gets_2_be_structured___nd_people_r_taken_2_a_place_whr_they_will_wait_until_their_houses_will-be_finished...therefore..they_are_said_be_in_temporal_houses...temporary_n*

d_temporal_is_not_related_in_definition_coz_i_do_understand_temporary_.is_it_okay_2_say_those_people_r_in_temporal_houses.?if_cn_go_back_2_ma_question.

5/31/16, 10:21 - Instructor: Look at my examples, those people are in temporary houses, just for a short period, while they wait

The instructor realized that the problem lay more in the word 'temporal' and decided to provide more examples:

5/31/16, 10:31 - Instructor:

A temporal representation of the history of South Africa

The temporal characteristics of students registered at Unisa

Temporal influences on physical beauty

Temporal affects in data mining

Temporal solutions to study skills

The integration phase was longer in comparison to the other phases in that we spent more time connecting ideas and exchanging thoughts in trying to clarify misunderstandings. Integration forms the core of most research in CoI, as supported by Akyol and Garrison who found that "the integration phase was the most frequently coded category of messages posted by students throughout the course" (2008: 9).

Resolution

The resolution stage is evident "where learners apply the newly gained knowledge to educational contexts or workplace settings" (Garrison & Arbaugh, 2007: 161). The best illustration of resolution was during the exercises based on the word of the day. This is when the groups checked their understanding of this word in the three questions posed. The exercises elicited much debate and provided more examples from the group; P14 also provided his own insight while the group was dealing with the exercises. In this manner, the participants applied new words to the educational context within the activities, but they also applied these words beyond the activities and exercises provided:

5/31/16, 11:16 – P14:
Whr_were_u_wth_those_typ_of_examples..?.i_grasped_it..thanx_sisi_otherwise_sory_4_being_a_slow_learner_there...

7/22/16, 19:31 – P15: I understand it now,heard a lot abt illicit funds leaving Africa. (The word of the day had been illicit).

6/2/16, 14:04 – P6: Hi.and venda chiefs buried at night . (The word of the day had been nocturnal).

6/1/16, 21:44 – P8: P8 has been indolent towards this research....🤣joking joking joking

7/29/16, 19:58 - P19: I think of you,as English connoisseur

The results reveal that there had been a progression from a triggering event to resolution; this made the activities "a worthwhile educational experience" (Garrison, Anderson & Archer, 2010: 6). It was important that there be some move towards resolution since Garrison et al. (2001) noted that students were often remaining in the triggering event stage without moving towards the other stages. While the authors related lack of progression to instances where the activity itself does not require much critical thinking, the role of the teaching presence is highlighted as playing a role in facilitating the development towards resolution.

The above examples reflect the true nature of the CoI as "the process of inquiry that describes the iterative and interdependent nature of the relationship between the individual and social dynamics" (Garrison, 2013: 7). The exchange might have been mainly between P14 and the instructor but the comments from other members enriched it while other members, even those who did not participate, also benefited. The interdependence between the individual and the community was evident.

It is acknowledged that there are different types of participants in CoI including task-focused users, content-focused, no-users, highly intensive users, content-focused intensive users and socially-focused intensive users (Kovanović, Gašević, Joksimović, Hatala & Adesope, 2015). Different participants generally took on the identity of different types of users depending on their needs at that particular time, within the limits of their availability and ability to engage

with the group. In the example above, P14 had a need to understand specific content; hence he was simultaneously a highly intensive and content-focused user. On another day, P14 was a socially-focused intensive user when he was engaging the group after he had missed his examination. P16, at a glance, might have been perceived as a no-user because she did not participate that much, but if one looks closely into other blocks of communication, it is apparent that she was one of the most intensive users in the group.

This was one of the instances that drew attention to the uniqueness of ODL and the fit-for-purpose role of mlearning in ODL. ODL students are otherwise engaged with other activities which demand their time. ODL students do not merely learn whenever and wherever, as purported by the flexibility of openness in ODL and ubiquitous nature of mobile phones, but learn whenever and wherever – within the confines of work and life contexts. In other words, mlearning allowed P16 to attend to her learning when she had a break from work, which on this particular day, was later in the evening. This does not mean P16 did not benefit from the discussions, or that the group members did not benefit from her contributions, for she did engage with her group members when she was available and able to. This notion brings to the fore a need for revisiting the concept of the types of users; a need to revisit the notion of flexibility within the constraints of real-life demands as well as reconsidering the dynamics of group participation. This demonstrates that mlearning is a dynamic intervention, providing the flexibility of both synchronous and asynchronous benefits to the users depending on their real-time circumstances.

The presences, therefore, interlink with the social presence by showing that the community does not merely interact for a socio-emotional outlet, but that its members interact to exchange ideas and learn together with and from each other. It is in the cognitive presence that the learning is broken down to illustrate the stages of that learning, from the first point of puzzlement to a point where what is learnt can be applied beyond the scope of the 'classroom'. The cognitive presence develops from the triggering event to resolution through facilitation in the teaching presence. Without design, facilitation, and direction, there would not be a progress towards understanding what is taught and further applying new knowledge beyond the confines of the 'class'.

6.2.3.3 Teaching presence

According to Brown (2003), the success of interventions depends on the teacher, to plan and design opportunities and environments for successful learning. The crucial role of the teacher cannot be undermined; it is the interaction through which learning is facilitated that should not be neglected (Swan, 2004) because it is through interaction that the teacher, learners and device engage.

The teaching presence refers to "the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes", according to Garrison and Arbaugh (2007: 163).

Design and organisation

The first category within the teaching presence is the design and organisation, which is indicated by setting the curriculum and methodology. Garrison and Arbaugh (2007) point out that this category involves, among other activities, setting and uploading lessons and notes; developing audio and video materials and images; providing insight and ensuring balanced schedules to cater for individual activities and well as group activities. They further argue that it is in this category that participants are taught about how to use the technology. It is evident that design and organisation should take place mainly before the course begins, but there were instances during this course where more planning and organisation were needed.

In this study, most planning and organisation was done at the beginning in the form of preparing the word capsules; developing VocUp; piloting and revisions as well as planning timeframes for the activities. It transpired, however, that in the middle of the course, more design and organisation was necessary when some lessons had to be redesigned or added according to the needs of the participants. The pre-course notion of this category is noted by Anderson et al. (2001) who assert that activities are mostly completed before the course starts while allowing for some adjustments during the course. Most of the activities at this stage are conducted by the instructor because, over and above dynamic discussions, instructors are seen as the most consistent predictor of successful online courses (Swan, 2004).

- Designing word capsules

The design of this course began with what had to be taught, how it had to be taught, to whom, when and how. The *What* question was lucidly responded to by research on the importance of vocabulary in language proficiency (Wilkins, 1972; Krashen & Terrell, 1983; Zimmerman, 1997; Politzer, 1978 as cited in Levenston 1979), to name a few studies. As to what exactly needed to be taught as part of vocabulary, Larsen-Freeman (2003) and Thornbury (2002) provided guidance on teaching form, meaning and use. There was a need to teach students how to spell the word correctly, define it and also use it appropriately. Vocabulary had to be taught to first-year students because anecdotal evidence based on their assignments and examination performance showed that they needed to improve their language proficiency. Regarding the specific vocabulary to be inculcated, the Vocabulary Levels Test (Schmitt, Schmitt & Clapham, 2001) was used because as it had gone through stringent validity and reliability processes.

The *how* was influenced by research which showed that mlearning had positive results on learning (Başoğlu & Akdemir, 2010; Hodgkinson-Williams & Ng'ambi, 2009; Makoe, 2010; Thornton & Houser, 2001), but the focus was on how ODL students learn with mobile devices. The cellphone was chosen as a suitable delivery mode because it is "a staple of day-to-day life" for all spheres of society (Pandey & Singh, 2015; 1).

The *how* question was also responded to through research which highlighted repeated exposure to vocabulary (Stahl, 2005); rehearsal (Craik & Lockhart, 1972); spaced intervals (Thornton and Houser, 2001) and systematic and planned vocabulary teaching (Dempster, 1996). In principle, this study concedes that implicit and explicit vocabulary teaching work for effective vocabulary development (Oxford & Scarcella, 1994); however, for this particular scientific study, vocabulary was taught explicitly (Ellis, 1997; Nation, 2001; Beck, McKeown, & Kucan, 2013) in order to exert some form of control over the study. Colleagues, family and acquaintances were enlisted to pilot the word capsules, with one colleague contributing to formulating some of the word capsules.

The word capsules were concurrently formulated with writing the code for VocUp as detailed in Chapter 4. All the research and planning was incorporated in the app instructions, manifest in that the app was set to send one word (together with the definition, part of

speech, example usage and exercises) each day; send a notification to users when a new word is sent; allow users to slide to the word of the day or example sentences or exercises as and when they found the chance to do so. The word capsules recycled some past words in the example sentences and exercises while the students could revisit past words in the Past Words list on the app. The same system was followed during the WhatsApp only and the WhatsApp + App phases of this study.

All the above planning occurred before the course commenced. It should be noted that during the study, more planning had to be done. When VocUp crashed in the initial days of the course, the organisation needed alteration, leading to word capsules being sent on WhatsApp. When the third phase of this study incorporated WhatsApp + VocUp, the organisation also evolved, to accommodate students who used both WhatsApp and VocUp.

Facilitating discourse

This category of the teaching presence was originally named "building understanding" (Garrison & Arbaugh, 2007: 163). The main focus of this category falls on ensuring that the participants understand the content as they build knowledge in the community. Because "interactions by themselves are not sufficient to ensure effective online learning" (Garrison & Arbaugh, 2007: 163), it is important that teaching presence facilitates the interaction so that it leads to understanding and application of knowledge.

- Multilingualism as a tool for facilitating discourse

Discourse was facilitated within WhatsApp groups through probing questions. It was telling of the ODL context that participants brought a vast amount of knowledge and languages into the 'virtual classroom' and it took the language skills of the instructor to facilitate such multilingual discussions. It was an added benefit that the instructor was able to understand the many languages spoken in the forums since multilingualism turned out to be a useful tool for facilitating discussions. The participants seemed to be keener to contribute to discussions in their indigenous languages. In fact, the most useful prompt was, "what would this word be in your language"?

6/1/16, 20:15 - P13: In Sotho mabotswa

6/1/16, 20:23 - Instructor: Excellent, P13

6/1/16, 20:31 - P16: Ukonqena ngesiXhosa

6/1/16, 20:45 - P14:
Same_nangesxhosa_livila_....isizulu_nesxhosa_share_some_words.
6/28/16, 20:02 - P24: It think 'Kuzikhiphisa' sort of tsotsi taal (Tsotsitall is street slang)

The mother tongue usage not only reflected the richness of the languages in a multilingual context, but it also played a socio-emotional role that made learning language a less foreign concept, instead of being one that brought the words alive. Some discussions focused on what the word would be in different indigenous languages:

7/7/16, 18:10 - P16: 1a, 2 a, 3b
7/7/16, 18:12 - P16: No I disagree with you in Xhosa ukokhama
7/7/16, 18:13 - P16: Or ukumokhama
7/7/16, 18:26 - P24: P16 we are talking about STRAGGLE not STRANGLE.
7/7/16, 18:26 - P24: Strangle means ukukhama.
7/7/16, 18:30 - Instructor: I like this exchange! That's the whole idea behind being in a group: exchanging ideas and creating knowledge so we grow together. Keep going

- Application beyond vocabulary lessons

What transpired in the discussions was that using indigenous languages led to applications of vocabulary to areas beyond our virtual 'classrooms' as participants worked on building understanding:

6/2/16, 12:02 - P6: At home we have a tree that close their leaves at night during the day is open. (Exchanging discussions on the word of the day: Nocturnal)

- Using a variety of texts

Teaching presence was also indicated in the use of voice notes and images in order to build understanding. Because of copyright limitations, we captured our own images and exchanged them whenever we were able to. One such example occurred when we had 'obsolete' as the word of the day. We exchanged images of old phones, old floppy and stiffy disks as well as appliances. The responses to these images was that of excitement and

enjoyment, but they also grasped the concept of the day. The participants shared personal meaning towards understanding and application:

> *6/3/16, 07:40 - P13: Fm radio with pm9 betries*
>
> *8/1/16, 09:53 - P16: Obsolete: it is something that is no longer in use and been replaced by something. Examples we no longer use a radio cassette instead we use a cd. We no longer use those phone with ariel we use touch screens*

While discussions around the word of the day were elicited with some success, the exercises functioned the best in prompting discussions around the word of the day. The participants came alive when we were discussing options and answers to exercises. The timing of the exercises, later in the early evening, was an important factor as that was when the participants were likely to be home or travelling home and, therefore, had more time to attend to their phones. Over and above timing, the exercises themselves gave the participants something to do to check their understanding. It was noticeable that those who had been completely quiet would start engaging when they were discussing exercises:

> *5/28/16, 14:15 - P9: Short and helpful and please continue with review exercise*

The exercises helped them to learn even more and heightened their confidence. The confidence booster must have come from producing a correct answer as proof that one had really understood the word. Because the exercises also recycled past words, the participants were able to recheck their knowledge of words covered previously.

- Healthy competition

Hwang and Arbaugh (2006) distinguish between Kiasu-Negative which is an attitude of competitiveness where a person prevents others from getting ahead of him or her and Kiasu-Positive which is a self-directed attitude where one strives to get ahead. In this study, the data showed healthy competition where participants, as an example of Kiasu-Positive, strove to be ahead:

> *8/19/16, 15:33 - P16: I would choose whatssap because we can be able to exchange ideas and vie to answer first. (Vie had been one of the words of the day. She is recycling)*

6/20/16, 10:04 - P16: 1 It opens up my mind and gives me challenge for the day and I would always want to be the first one to unswer

Some students found it problematic that anyone could answer questions at any time:

6/18/16, 09:50 - P24: 5. Answers for exercise, how about people send you a private message then you come with correct answers to the group. First person who gave answers for the exercise all the other people follow her/him.

Using the app and WhatsApp, however, meant that one could work on his or her own before joining the group:

6/22/16, 19:26 - P6: 3.u let us use any language ,even learn the meaning in different languages. And allows us to answer it anytime when we had time,theT was no specific time.

- VocUp

On building the app, VocUp, I included a feature in the exercises activity that would alert the user if the chosen option was incorrect: the option shook and turned red. The interaction between user and device was one of the most favourite features of the app. In this instance as well, the exercises, either in a group or individually, provided a useful and productive tool for facilitating meaning:

8/19/16, 15:33 - P16: It is easy to notice that you wrong.

6/1/16, 22:05 - P8: I liked the look of it. Easy to understand. Very helpful with those examples. Loved the shake of the incorrect answer

The above examples illustrate that participants share personal meaning as discourse is facilitated through instructor-learner, learner-learner, learner content and learner-device interaction.

Direct instruction

Each word capsule taught vocabulary explicitly while the discussions allowed for building and application of understanding:

5/22/16, 08:01 - Instructor: Dissipate
Verb

To disappear. To cause something to waste away. To scatter in different directions. To use up something in an irresponsible way.

Examples
He won the lotto but soon his riches dissipated due to his gambling habits.
The love they used to share dissipated in the face of their financial troubles.
The riot police dissipated the crowd which was getting violent.

5/22/16, 20:30 - Instructor: Exercises
1. Which of the following words best completes the following sentence.
She was left_____ after she dissipated the family fortune in irresponsible business deals.
a) rich
b) poor
c) encouraged

2. Choose a word that means the opposite of dissipate.
a) grow
b) evaporate
c) squander

3. Which of the following things is not likely to dissipate?
a) clouds
b) investments
c) wind

What was crucial in the data was the importance of the instructor's expertise, knowledgeability of the subject matter and teaching skills. The temporal/ temporary example detailed above is an illustration of how direct instruction could assist in reaching resolution. The participants not only appreciated VocUp in that it taught them new words, but they also appreciated the WhatsApp lessons:

7/4/16, 07:26 - P24: Thanks for your feedback, I see now what you mean by agreement between pronoun and verb.

7/29/16, 19:58 - P19: I think of you,as English connoisseur (Connoisseur had been one of our words of the day. She spelt correctly.)

- Instructor acknowledgement

Over and above the pedagogical attributes of the teacher, there transpired an appreciation for the emotional support:

6/18/16, 10:08 - P24: I thank you also sis Instructor for your time and patience with us.i realy learn a lot. Wish I can have something like this for other modules🙈

5/29/16, 21:04 - P2: Enkosi Instructor for being so kind to us and very patient

5/29/16, 20:53 - P15: Thank u! I really appreciate your concern

- Context awareness

As mentioned earlier, there is a plethora of apps and vocabulary programmes in the market, but few are contextually relevant for the ODL students in this study. The discussions in the group were enriched by application to real-life people and events. Our discussions, therefore, included talking about Nelson Mandela and the International Mandela day when we were tackling 'Pacify' as the word of the day:

7/19/16, 19:31 - Instructor: I especially love Question 3 as a tribute for yesterday's International Mandela Day!

7/19/16, 19:32 - P19: Me too,what did u do yesterday

7/19/16, 19:34 - Instructor: Yesterday, I did various acts of random kindness

7/19/16, 19:38 - Instructor: And what did others do yesterday?

7/19/16, 19:41 - P19: Hm🙈

7/19/16, 19:41 - Instructor: 😅

7/19/16, 19:51 - P17: I was doing rhymes at crech with children(khawtsibe katana).

7/19/16, 19:58 - Instructor: Oh sweet! I guess you were inspired🙌 👏 👏 👏

7/19/16, 20:03 - P17: 🏃

7/19/16, 21:07 - P19: Wow

The discussions were also broad, such as including national and international sports figures who lost endorsements when we were discussing 'Endorse' as the word of the day.

- Native speaker vs non-native speaker debate

Another finding in this study with regard to the teaching presence was the marked revisiting of the non- native English speaker teacher. According to Davies (2003), nativeness in English

or any language, for that matter, is characterised by acquiring the language during childhood; ability to understand and accurately produce idiomatic forms of the language; understanding how standard forms of the language differ from the variant that they themselves speak; competent production and comprehension of fluent, spontaneous discourse. It is possible for a language learner to reach a near-native level, save for the childhood acquisition (Birdsong, 1992).

At a glance, the data shows two distinct characteristics associated with mlearning and ODL. The first is that the sentences, and fragments, are short and at times expressed in an emoticon. This is a distinct feature, characteristic of the medium of instruction and research. This study investigated the experiences of students and it was clear that this is how they learn in mlearning, in shorter direct conversations. The lessons themselves are short and succinct. The discussions were also pithy, yet containing complete insights and benefiting the community.

The second prominent feature might be deceptive on the surface, as it seems the voice of the instructor is dominant. The raw data, the WhatsApp conversations, appear to depict a picture of a teacher constantly owning the floor. A closer look at the data, however, shows that inasmuch as the instructor spent time teaching, her turns in the conversation are sometimes used for prompting conversation; for guiding learning; for encouragement as well as for feedback. While the participants also engaged in encouraging others; contributing to learning; discussing content and keeping the group going, there seemed to be some reliance on the instructor as an authority figure. This is characteristic of ODL where students are so used to studying alone, and the mere presence of a lecturer is a welcome reprieve from the isolated life of being an ODL student:

> *7/15/16, 18:52 - P3: Do you agree? (Waiting to get approval from the instructor)*
>
> *7/25/16, 19:19 - P19: So they are the exact answers or we are wrong?*
>
> *7/25/16, 19:31 - Instructor: Yes, they are correct* 👌
>
> *6/18/16, 10:08 - P24: I thank you also sis Instructor for your time and patience with us.i realy learn a lot.*

The teaching presence facilitates progression towards attainment and application of new knowledge through design and organisation, facilitating discourse as well as direct

instruction. In the excerpts above, the participants show not only attainment and application of knowledge, but also a high level of satisfaction and a sense of community.

While the data in this study demonstrated themes that fit aptly within the CoI elements, there were themes that did not obviously form part of the CoI since the study used both deductive and inductive data analysis. According to Braun and Clarke (2006), each theme tells an important story about the study and sheds light to the inquiry. Themes of learner presence and device presence could not be discarded since they were prominent in the data, in that they were repeatedly visible and narrated an important story about the experiences of the participants regarding using mobile devices to learn vocabulary in ODL.

The Table below presents the themes, which emanated from data as additions to the CoI.

Table 6.3: Proposed additions to the Community of Inquiry

ELEMENT	**Categories**	**Indicators**
DEVICE PRESENCE	Accessibility	Convenient access
	Usability	Ease of use
	Facilitating learning	Enhancing teaching and learning
	Security	Device protection
		Content and user protection
LEARNER PRESENCE	Background	Acknowledge socio-economic dynamics
	Barriers	Offer options
	Socio-political struggles	Recognise personal realities

The presences that emanated from data have also been suggested since these two themes are in line with Koole's (2006) proposal for the consideration of device, learner and social aspects. The only disadvantage of Kool's model is that the teaching and cognitive presences, which feature prominently in the data for this study, are not explicitly covered.

6.2.3.4 Device presence

The entire process of teaching, learning and research in this study took place on mobile devices. It is imperative, therefore, to recognise that the environment on and through which social presence, cognitive presence and teaching presence interact, should be prominently present within the community of inquiry. Swan (2004) questions the lack of attention to technologies through which learners and teachers interact and where learners interact with content. While there are copious amounts of research on learner-learner interaction,

learner-teacher interaction and learner-content interaction, there has been a paucity of research on learner-device interaction, even when interaction is conducted through and facilitated in technology-enhanced environments, even years after Hillman, Willis and Gunawardena, (1994) noted it. Anderson (2016), in considering a suggestion of a media presence in CoI, submits that the presence of a form of media would be a minor factor that is unique to each teaching context. Because of the uniqueness of the ODL context in this study and the not-so-minor prevalence of issues around the medium – in this case, mobile devices – in the data for this study, the addition of, and attention to, device presence is justified in this study.

The justification of the device presence has been further supported by Kovanović et al., who declared, "Although heavily dependent on educational technology, our review of the CoI literature revealed rather limited research that studied the relationships between learners' use of educational technology and the dimensions of the CoI model" (2015: 72). Although research into the relationship between CoI and technology is still to develop, there has been some research into perceptions of the value of technology in the CoI categories (Rubin, Fernandes & Avgerinou, 2013).

Accessibility

According to Brown (2003), mlearning has potential to make learning even more accessible than e-learning could. After the orientation and establishment of group ground rules on WhatsApp, a link to VocUp was posted that the participants were required to download on their phones. One of the first responses highlighted the importance of technology, specifically the device presence, in this study: it was the following.

5/19/16, 17:33 – P3 I can't download this app

This crucial, yet ambiguous, statement prompted further inquiry because it could not be determined whether the problem lay with the device; the instructions for download; lack of internet connectivity; lack of interest in the app or the study; a physical impairment such as sight; or lack of access to the app itself. Upon further engaging with the participant, conversations on the WhatsApp forum as well as interviews, it was established that the

inability to access the app was related to the device itself, data cost, internet connectivity, financial constraints and security-related issues (Shandu, 2017). These reasons either restricted or barred access to content.

- Device restrictions

The appeal of mobile learning is the fact that one uses the ubiquitous mobile phone, which has become an integral part of one's daily activities (North, Johnston & Ophoff, 2014). The question arises: what if you cannot access the content at a place and time you need it because of the device limitations? The mobile phone as a device wherein research, teaching and learning took place, and a device through which interaction transpired, proved to be a source of both frustration and benefits. Access to the content was important to the participants so that they voiced their frustrations when their device seemed to hinder the said access:

> *6/26/16, 19:00 - P16: On my phone gave me a problem so I could not get the app*
>
> *6/21/16, 11:36 - P9: It doesn't want to download on my phone!*
>
> *6/1/16, 05:54 - P7: Mornings! I'm back my phone was not working*

Sometimes the problem was not limited to accessing content, but also affected the ability to interact with others in the community:

> *6/7/16, 21:40 - P14: Eish_askis_ma'am_ma_phone's_space_button_is_not_working,so_i_use_dashes_2_seperate_my_words.*

Accessibility was not viewed only from the perspective of accessing content and interaction since lack of access was also viewed from an exclusion point of view. This idea resonated strongly in an environment where students already felt they had been obliged to beat many odds to access education, and were sensitive to being excluded:

> *5/31/16, 08:41 - P18: … I just appreciate the fact that you choose to use whatsapp to accommodate everyone*
>
> *5/20/16, 21:40 - P19: Great plan indeed,so that all of us can participate*

5/29/16, 20:51 - P19: To be honest I cannot say much about it,because my phone did not allow me to go to internet,so I just catch up few words the ones they discussed on whatsup.It did not work for me,bt this new one it does

At other times, the handiness and swiftness of exchanging messages was also a pitfall because sometimes, incorrect messages were shared with the group. The example below where people mistakenly send irrecallable messages on WhatsApp should be a thing of the past according to Venktess (2017). Venktess reports that WhatsApp users will soon be able to recall and delete messages from recipients' inboxes. This new development will curtail many public embarrassments caused by technological faux pas when people send messages in error owing to incorrect content or recipient:

8/4/16, 22:03 - P8: 💏😳❤❤❤😳

5/21/16, 23:25 - P26: 0pj

5/21/16, 23:27 - P26: Sorry mistake

The relief and elation were palpable when the technology worked well:

5/19/16, 13:36 - P8: Thank you, I have downloaded and all ready

6/21/16, 19:48 - P8: Hi there I've installed and it's working. Thz

5/19/16, 18:25 - P24: Thank you Instructor. I manage to install the app.

Familiarity with technology

Familiarity with technology or lack thereof, even after orientation, determined whether one would be able to access the content or participate successfully in the intervention. Squires (2014) has argued that most, if not all, challenges and shortcomings associated with mlearning are actually related to the users' comfort and familiarity with the technology used. Some participants experienced difficulty, not because of the app or the content of the lessons, but because they were not comfortable or familiar with the technology involved.

In the example below, there had to be a side chat with this participant because chatting on the group was irrelevant to the group members who had already downloaded the app. The exchange below points to the participant's lack of familiarity with the technology and

process of downloading from a link. It also highlights the need for extra orientation for other students, which is made possible through mlearning:

5/19/16, 17:33 - Instructor: Where are you stuck?

5/19/16, 17:33 - Instructor: What phone are you using

5/19/16, 17:34 - P13: I tried to type all those alphabets,is that how it is done

5/19/16, 17:34 - P13: Samsung Grand

5/19/16, 17:36 - Instructor: Okay. Click on the app link that I sent (the many numbers and letters)

5/19/16, 17:37 - Instructor: It will ask you if you want to download the app and if you agree that it is still a test app

5/19/16, 17:39 - Instructor: You might have to go to Settings, App security, click on Allow app installation from unknown apps. Allow the app because your phone does not know my app because it's not in the market

5/19/16, 17:41 - P13: I did and it says install but I don't know where to from here it does not show

5/19/16, 17:42 - Instructor: Click okay okay okay until it says open

5/19/16, 17:43 - P13: It says finish open,I clicked open,then what next?

5/19/16, 17:44 - Instructor: Oh you can slide the screen down. Where it says download complete, click on that Download Complete Notification and then you can click open

5/19/16, 17:45 - Instructor: Slide to the left to see examples and to do the exercise

5/19/16, 17:46 - P13: Ok will keep trying hopefully will get it

5/19/16, 17:47 - Instructor: But when you are at Finish and Open then you are good to go

5/19/16, 17:54 - P13: Ok thank you

5/19/16, 18:02 - P13: I found it,thank you so much.

In the following examples, the users had to be familiar with the concept of changing phone settings in order to successfully download the app:

5/29/16, 20:57 - P24: The app was not difficult to download except for changing settings to allow it, becouse my settings is only allowing something from play store

6/1/16, 22:05 - P8: Good evening,apologies for only responding no. I found it rather easy to down load the app,after I got the settings on my phone correct.

- Flexibility

Another concept linked to the accessibility of technology is that of flexibility, which refers to the freedom of learning irrespective of any fixed time or place (Sarrab, Al-Shihi & Rehman, 2013: 834). The participants enjoyed and appreciated the fact that they could access their learning whenever and wherever they found an opportunity:

8/19/16, 15:33 - P16: 1 it is easy you can answer any time and any where when you get a chance… Mostly at work even if am shopping .

Flexibility is also related to the time of accessing content. Researchers, mostly in contact teaching and learning contexts, such as Cavus and Ibrahim (2009), have found that students prefer not to receive mlearning materials after 17:00. Such a finding is reminiscent of the teaching and learning context where students spend the day focused on their studies as is the wont of full-time students. With the students who spend their days at work or attending to other daily activities, other than studying, the evening was found to be the most active time for group interaction. The flexibility of storing the content on one's mobile phone to access when they had time was a welcome benefit to the participants:

8/18/16, 17:19 - P19: Most of the times late at home when Im free or relaxing. (This was in response to the question of when this participant usually accessed the content)

5/30/16, 12:54 – P20: promble at work don't use phone most of the time

- Internet connectivity

Inasmuch as the technology was accessible in a flexible manner, there were unavoidable challenges with internet connectivity:

> *5/19/16, 13:42 - P2: Thuli can you please send to this no *** *** **** I'm struggling with MTN network*
>
> *5/30/16, 07:52 - P3: Good morning, unfortunately I was away and had almost no signal. Therefore I could not upload the app*

Usability

The definition of usability includes factors such as the ability of users to learn to use the technology; the ease with which users can memorise the steps in using the system to perform tasks; satisfaction as well as using the technology without errors (Dirin & Nieminen, 2013). In other words, mobile devices, within the mlearning context, should be easy to use and easy to learn from (Ting, 2012). What the data shows is that while student-student, student-teacher and student-content interaction (Moore, 1989; Makoe, 2012) remain conspicuously at the forefront of ODL, the rise in emergent technologies is enough to engender crucial research towards student-device interaction (Hillman, Willis, & Gunawardena, 1994). If then, emerging technologies offering a myriad of mobile and wearable devices are to be part of mlearning, it stands to reason that those devices' usability should be brought to light. In this section, the usability of VocUp as well as WhatsApp in relation to the devices used as part of mlearning will be discussed, based on the data analysed in this study.

- Ease of use

According to Dirin and Nieminen, "There is a need for developing applications in a user-centred way ending up with high usability" (2013: 131). This means that the devices and applications used for mlearning have to consider the users and how they will experience content using those devices. The app interface, therefore, must be designed in such a way that it makes it easy for the user to use the technology. The ease of use pertained to downloading the app as well as using it:

6/1/16, 22:05 - P8: Good evening,apologies for only responding no. I found it rather easy to down load the app,after I got the settings on my phone correct.
8/19/16, 15:33 - P16: It is easy to notice that you wrong
5/29/16, 20:47 - P5: Hi the app is a good idea. Downloading was user friendly. With the exercise it allows you to check the answer.

While the participants enjoyed VocUp, there was a resounding preference for learning vocabulary on WhatsApp. It is the conclusion of this researcher that the familiarity with WhatsApp, as an app the participants had been using prior to the study, made it an easier option to use, and hence a preferred one:

8/18/16, 11:44 - P13: It was easy for us on WhatsApp than the App.the only thing you could change is exemple sentences should come from us not from you,we should word harder and you help us where we struggling.

- The User Interface

The term user interface refers to how an app is displayed so that it looks and functions well (Gargenta & Nakamura, 2014). The participants' comments on the user interface demonstrated that they not only appreciated VocUp because it looked appealing, but they also enjoyed how it worked:

6/1/16, 22:05 - P8: I liked the look of it. Easy to understand. Very helpful with those examples. Loved the shake of the incorrect answer
6/22/16, 19:06 - P6: 1.I enjoyed the way you display it . you even gave us examples of de words and how to use it in the sentences.

5/29/16, 20:47 - P5: Hi the app is a good idea. Downloading was user friendly. I liked the fact that the app is user friendly and sends you a message when you receive a new word

Facilitating learning

The device presence should be a part of the community of inquiry because it not only serves as the environment in which teaching, learning, social and cognitive presences take place, but the use of the device also facilitates and enhances learning. Swan argues, "learners must

make of specific technologies, platforms, applications, and course templates to interact with course content, instructors and classmates" (2004:1). In this study, for example, the cellphones were not limited to being a device with which participants interacted, but the technology was also used for interaction with course content, instructors as well as other learners.

- Content review

The device allowed the participants to go back to the content to review it. The following example provides an important illustration of the significance of paying attention to the device in the community of inquiry. It distinguishes the mobile phone from other technologies. A radio as a medium or piece of technology, for example, would have yielded dissimilar results in this study because firstly, once something has been announced on the one-directional radio, the students cannot stop and review unless they have recorded the session. Secondly, there is feedback on the participant's response and she quickly corrects herself:

> *5/31/16, 20:18 - P26: I see now because I went back to check the definition again. Correct answer is 1a*
>
> *5/31/16, 20:19 - Instructor: 1a?*
>
> *5/31/16, 20:21 - P26: Sorry 2a*

The participants also appreciated the fact that they were able to review past words because VocUp keeps a list of past words that the users can click on to refresh their memories. Since WhatsApp also saves all chats and one can email those chats to themselves for filing, the participants had unlimited access to review their past lessons:

> *5/29/16, 21:28 - P16: It helps a lot to me and if it is possible I will keep it even after exams*🤗

- Multimedia capabilities

Using WhatsApp allowed for various media to be utilised as part of learning. Cavus and Ibrahim (2009) found that it was easier to send an image of something than to spend time on long and complicated descriptions. The experience with P14 attests to the fact that, on

occasion, longer explanations only lead to more puzzlement; examples are more effective. With WhatsApp, we shared voice notes for pronunciation and songs and images as examples or descriptions. We shared images as exemplified below for the day we had ‘Obsolete’ as the word of the day. We also shared voice notes where words were pronounced.

Figure 6.2: Examples of exchanged images: Obsolete

Sometimes I would find the words we have covered had been used in other texts. One such example is when ‘Vie’ appeared in one of the publications in circulation. The word was captured using the phone camera and sent to the groups.

Sometimes, the participants shared images to show their appreciation of the teacher.

Figure 6.3: Example of exchanged images: appreciation for the teacher

Lack of multimedia capabilities was among the highlighted drawbacks of VocUp; the participants articulated that they learnt well with multimedia and indicated that they wanted such an addition on VocUp to enhance it:

> *7/7/16, 18:22 - P3: Hi Thuli, I was wondering if you could not send a voice note with the word for us to hear the proper pronunciation? That is often a problem.*

- Independent study

Whereas most participants revelled in learning on WhatsApp, a few preferred to work independently, while some preferred to work on both VocUp and WhatsApp where they would work on VocUp and then join the conversation on WhatsApp. The device and VocUp functioned in tandem to ensure independent study. The app sent a notification to alert busy students to check their phone, while the notification envelope icon remained on the screen until the new word had been checked. VocUp also contains the part of speech, definition, sample usages and exercises so that one can learn the form, meaning and use. By sliding back and forth on the cellphone, the user is able to access any of the sections of the Word Capsule when they need to. The exercises are also ideal for self-study in that, as recounted, one receives immediate feedback if the option selected is incorrect because the option shakes, vibrates and turns red. This prompts the user to return to the definition and example sentence to learn even more. When a correct option turns green then the user knows they have performed well.

Security

Because VocUp is still in its developmental stage, it was not placed live on the Google Play Store, but was distributed through TestFairy as a link that the participants had to click and download. Efforts were made to convince the participants that the link was safe but making them trust the link was a formidable task because they experienced strong trepidation regarding links and downloading unknown apps. The threat of malware is so real that Kambourakis posits that system and data security and privacy are “crucial for any educational realm” (2013: 69):

6/26/16, 19:17 - P3: I am hesitant to offload the app on my phone as I get serious security warnings and do not want to take the risk that data can be copied.

8/20/16, 08:03 - P3: Because of the confidentiality risks involved in allowing app into system.

The participants approached the link to the app with reservations and apprehension. The warning by the system on dangers of downloading apps outside the Play Store heightened their apprehension. It took much convincing to reassure the participants that the link to the app was no Trojan horse that would open the door to malware and other security risks.

One participant sent an image of an alert on the device to demonstrate the magnitude of the threat.

Figure 6.4: Security warning

System and data security and privacy was the most prominent security threat, based on the data in this study. This study reveals that ODL students prefer what they trust and they are familiar with. If we are to convince them of the benefits of an intervention, we have to convince them of the trustworthiness of that intervention and ensure protection.

The participants in this study vividly illustrated that the device's accessibility, familiarity, connectivity, facilitating learning and security were important technology considerations since these influenced the majority preference for WhatsApp over VocUp. What the data also revealed, however, was that there were participants who found VocUp self-sufficient

while others preferred a combination of WhatsApp and VocUp. The device is evidently at the centre of the decision between VocUp and or WhatsApp. One participant, however, concluded the whole debate; when asked if she preferred WhatsApp or VocUp, she firmly stated the following:

> *8/18/16, 17:19 - P19: ….I think both,because there are both important on either ways*

6.2.3.5 Learner presence

In 2016, Anderson conceded that Shea and Bidjerano (2010) had offered a considerable argument for the crucial role of the learner in teaching and learning, and that such a role should be considered as part of the CoI. Koole (2009) also presented strong arguments for an inclusion of what she terms the learner aspect in the FRAME model for mlearning. According to Koole, considerations of the learner in mlearning should include "prior knowledge, memory, context and transfer, discovery learning, and emotions and motivations" (2009: 30). Koole's model leans more on the cognitive disposition of the learner, specifically regarding knowledge association, retention and application. Koole concedes that the leaner aspect is primarily cognitive when she indicates that the FRAME discusses mlearning as a process resulting from the convergence of mobile technologies, human learning capacities, and social interaction. The learner presence element should comprise learner background; barriers; and socio-political realities. These categories are indicated in acknowledging socio-economic dynamics, a need for flexible options as well as articulating personal realities.

Learner background

In every educational environment, the participants will differ in relation to their background. Such differences are more pronounced in ODL owing to the spatial and temporal distance among the students and between the students and the institution. According to Cristea and De Bra (2002) such differences mostly pertain to the knowledge they bring to the learning environment as well as the social environments they come from. In this study, the participants acknowledged the differences in their backgrounds, whilst they also used the vast prior knowledge they possessed to exchange ideas and learn from each other. The following extracts illustrate some of these backgrounds:

6/1/16, 11:11 - P16: It reminds me back then when I was at high school level, I didn't like to wake up in morning as a result I was always late at school. One other day when I was about to enter the school gate the principal closed the gate and chased us away because we were very late, and I decided to go back home and my mother so me at a distance nd she lock the gate too, she tolled me that she will open for me after school. From that day I decided to change my attitude and became serious about being early at school😂😂😂

6/22/16, 19:36 - P6: 6 . please cc continues with vocabulary it helps .and benefits a lot .especially us who never have a libraries nearby at the early stage.Thanks Thuli again

6/13/16, 11:28 - P15: Will go to the chemist,don't have medical aid,Drs charge a lot for consultation

These threads of conversations show that in our planning to implement mobile learning we need to take socio-cultural issues into consideration. We have to be aware that the beneficiaries of our interventions might be from reading-deprived backgrounds; come from rural areas; feel underprepared owing to perceived basic education inadequacies and or have limited access to assumed technological resources. If openness in ODL is to open higher education to the masses (Olakulehin & Singh, 2013) and redress the past inequalities where education was reserved for the elite few (DHET, 2014), then mlearning should consider students' backgrounds in order to accommodate them. If the students cannot even afford to consult a doctor to receive proper medical care, we cannot expect them to spend much on anything else. In trying to implement mlearning, we should attempt to incorporate plans that would not further exclude students from benefiting. ODL emphasises inclusion and accessibility; we should thus be cautious of being presumptuous about student backgrounds by creating interventions as all-encompassing. Instead, we should be prudent and offer options to students.

Barriers

According to Shandu (2017), students in ODL have a myriad of responsibilities, in addition to their studies, which could restrict or completely halt their participation in, or gaining from, the benefits of mlearning. The constraints include the following.

- Time constraints

According to Fozdar and Kumar, “lack of time due to job and family responsibilities was one of the most prominent reasons for students dropping out of courses and programmes” (2007: 12). In this context, the time constraints pertained to work and family responsibilities.

Even the most exciting discussions and informative lessons could not be attended to, because of work commitments:

> *5/27/16, 19:29 - P6: Hi am so sorry, I Was very busy today at work.*
>
> *5/22/16, 12:56 - P24: Morning everyone, I was very busy at work this weekend*

Some participants could not participate in the activities, as they had to focus on other courses for which they were registered:

> *5/24/16, 21:55 - P9: I was writing exams today I didn't have enough time for my phone*
>
> *5/20/16, 20:09 - P6: Good night. Busy with my assignment.*

- Family responsibility

Sometimes the participants had to attend to family responsibilities. Because these were adult learners, it makes sense that they had to be in charge of, as well as execute, family duties:

> *6/16/16, 20:44 - P2: Thuli can we do on Monday because here at home there are lot of visitors we have funeral this weekend my grandma pass away*

- Physical constraints

The reality is that sometimes students are not physically able to engage with content or interact with the community:

> *7/19/16, 20:45 - P6: No I didn't contribute yesterday , I was at the hospital sick .*
>
> *8/9/16, 18:55 - P3: I'll post tomorrow. Just too tired.* 😒

- Social and cultural demands

The data collected in this study illuminated a side of the students that is often not considered: the students encounter social and recreational demands which they have to

meet. It was unexpected to learn that this participant could not attend to a study-related activity because of taking part in sport. Upon further inquiry, it emerged that soccer is more than recreation to men in the townships: it is part of their moral and cultural fibre, and it is their life (Wilson & Hattingh, 1992). Wilson and Hattingh continue to state that for a black man, "soccer already forms an integral part of his way of life" (1992: 479). When this participant said the words below, he was not talking about socialising for fun; he was talking about a part and parcel of his life:

> *7/8/16, 13:53 - P14:*
> *Nop_i_was_busy_on_that_day_i_remember_went_2_play_soccer...*

- Financial constraints

Over and above time constraints, ODL students face financial demands. In most cases, the ODL student needs to fund his or her own studies while taking care of the family and attending to life's financial demands. Research has illustrated how financial constraints could lead to students dropping out of their programmes (Fan & Chan, 1997; Okopi, 2011) due to the added distress over and above their studies:

> *6/13/16, 11:16 - P14:*
> *Economic_struggle_is_indeed_a_problem_in_this_country our_parents_work_as_domestic_workers_for_us_2_attain_a_so_called_good _education..*

The financial restrictions were evident in this study with regard to data bundle costs. While mlearning is deemed as a financially viable mode of learning (Fozdar & Kumar, 2007), this study revealed that administrators and teachers have to be cautious and find prudential ways to keep costs minimal. Some participants baulked at added data costs they associated with downloading VocUp while others could not participate on WhatsApp as they had run out of data:

> *8/19/16, 04:32 - P27: I didn't participate in the group because most of the time I struggle with my phone the bundles do not last until I realize later that I can change the network without changing my number so that I can buy cheaper bundles that will last and i can chart the whole month*

Overall, the participants preferred working on WhatsApp as they felt it was the more economical option:

> *5/31/16, 08:41 - P18: …*
> *I still think that whatsapp is the great idea, because some of us do not have money to download while whatsapp is affordable*

Socio-political struggles

Perhaps the most disquieting finding in this study was the corroboration of the interrelatedness between education and the socio-political realities our students faced. The problems our students face keep them marginalised and they come to Unisa as an ODL institution in order to be able to access an education which is otherwise out of reach. Makhanya, Mays and Ryan declare that ODL "can provide for those who might otherwise be marginalised by work, ethnic, geographical or other factors, such as physical disability or age – thus uniting development and social justice concerns." (2013: 1385). The need for social justice was laid bare with such lucidity in the data that it emphasised its imperativeness and the urgency for institutions to consider fairness for our students.

The conversation below began when one of the participants was late for his examination:

> *6/13/16, 11:20 - P14:*
> *I_was_3_minutes_late_4_exams_train_delayed_4_30_minutes_its_the_khayelitsha_train_i_was_not_granted_access_2_exams_nd_its_not_fair_really..this_8:30_is_not_fair_...i_had_2_take_a_train_4rm_khayelitsha_at_5:50_nd_delay_happens_nevertheless_i_get_2_vasco_hav_2_take_another_taxi_2_the_exam_venue_it_is_far...and_this_suits_the_people_who_stay_near_by_such_as_goodwood,bellar_etc_the_poor_disadvantaged_masses_of_our_fellow_students_stay_in_khayelitsha,paarl_etc...Economic_struggle_is_indeed_a_problem_in_this_country_and_rules_we_r_obliged_2_are_an_impossible_2_meet_somtyms_the_university_has_2_do_somthing_bwt_this_because_its_not_just_at_all_and_our_voices_have_2_be_heard..many_of_us_dont_work_but_our_parents_work_as_domestic_workers_for_us_2_attain_a_so_called_good_education..the_option_we_r_left_wth_is_2_re_register_whr_must_we_get_the_money_4rm?schools_have_turned_out_2_function_as_busness_now_...a_moduled_payed_for...has_2_be_payed_4_again..because_u_were_3_minut*

es_late_its_not_fair...UNISA._to_me_is_smthing_i_would_not_want_2_say_write_now.

6/13/16, 11:29 - P14:

No_it_is_situated_somwhr_in_the_surburb_NEar_N1.GOODwood_whr_white_students_live...

The above posts demonstrate various socio-political issues relating to living far from key resources such as examination venues; being forced to rely on unreliable public transport; fairness; economic struggles as well as despair. What emerges prominently from the above posts, however, is that the onus is placed on the institution to consider the students' background as a matter of fairness. According to the participant, the university should consider changing the exam time; the university should also consider examination venues so they do not seem to favour the rich. What this student is emphasising, though, albeit in an emotionally charged tone, is the need for flexibility. Flexibility would have allowed for innovative assessments or at the very least allowed the students room to accommodate those who live very far from the examination centre. Mlearning has the potential to offer such flexibility. In response to the student's frustration, the student was encouraged to write an email to the course leader as well as the examination administration to explain his plight. The response received was disheartening:

6/13/16, 11:27 - P14:

Taliking_of_emails_in_the_very_end_of_an_impossible_place_4_an_internet_accessibility_...i_hav_2_take_a_15rand_taxi_2_parow_2_campus_lab...or_library.whch_is_situated_a_few_km_away_4rm_whr_i_stay

Within the group, the other participants consoled and encouraged this participant, but he was distraught. Someone in the group had experienced a similar incident in the past and shared this as a way of reassuring the participant:

6/13/16, 13:54 - P13: P14 I'v bn ther I know hw it feels m doing only ENN kule term ngoba ndaba late (I am writing only this module because I was late for the exam)

The encouragement and comfort did not help as the participant was discouraged and vowed never to return to his studies. Unisa is taking strides towards e-learning and some steps towards mlearning, but if those plans neglect to consider the socio-political dispositions of education, we might do a disservice to those we purport to benefit.

6.3 Discussion

6.3.1 Vocabulary learning

The vocabulary mobile app was developed specifically for vocabulary teaching and learning; the multi-componential framework, which focuses on form, meaning and use, was employed. In addition, WhatsApp, as a learning environment, was used to facilitate the teaching and learning of vocabulary form, meaning and use. This section discusses the different aspects of word knowledge.

6.3.1.1 Knowledge of vocabulary form, meaning use

Form

Form refers to "knowing how to spell and interpret the letters which make up the word." (Oxford & Scarcella, 1994: 232). When learners encounter a new word, it takes effort to move beyond encounter towards understanding the word and using it appropriately. The participants in this study expressed delight in seeing new words and learning how they are spelt, defined and used. They emphasised that they also wanted to learn how the words sound, asserting that it was important to them not only to see the spelling, but to hear the pronunciation as well. For students who encounter many different words as they learn new concepts in their studies, this finding is illuminating of the ODL context. If a student receives a compilation of paper-based materials, no matter how well explained, he or she may need to hear the words as a model so that he or she, in turn, will be able to pronounce them correctly. This was a discomfiting reflective moment because I have been an ODL lecturer for many years, but the audio materials I have focused on are limited, to say the least.

The data showed a trend regarding knowledge of word form and correct orthography. The platform that we were using was informal and accommodating of language use, so much so that the chat exchanges involved some spelling errors, code-switching and the use emoticons to express emotions and ideas. It was noted that the words that had been taught were consistently spelt correctly. The reason may be that participants were recycling these words in general chats or creating their own example sentences to show that they understood the words covered. Whatever the reason, participants always spelt previously taught words correctly. This shows that focus on form raised their awareness of the spelling and subsequently impacted on their comprehension of the orthography of the learned word.

Meaning

Participants also learned from the definitions provided; they were able to discuss with each other and clarify meaning using the definitions. According to Larsen-Freeman (2003), meaning refers to denotation: the dictionary meaning. Oxford and Scarcella (1994) argued that contextualised vocabulary activities hold promise for vocabulary learning in that a word is not merely juxtaposed with its meaning, but meaning is also in context. In this study, the words were defined, after which example sentences provided meaning in contexts of use.

Most notable in this study was how participants used the definitions to construct meaning in their own languages as they did their best to make sense of the words. They exchanged views on gaps in their first languages (L1) when they could not find equivalent words which meant the same as the word of the day. Further, they worked together to find the closest L1 equivalent as they worked towards reaching understanding.

Especially salient was how meaning was negotiated through multiple texts. The definition provided in phrases was also expressed in images. The participants exchanged images to portray their understanding of the meaning of the word. Audio clips were also used as examples to highlight the meaning of words. In short, the participants did not only see and hear the words, but they also grasped their meaning in a variety of ways.

Use

Knowing what a word looks like or sounds like and its meaning is not sufficient if one does not know how to use that word appropriately in varied contexts. Oxford and Scarcela assert that knowing a word "involves being able to use the word communicatively in the context of purposeful interaction." (1994: 232). Language is ultimately for use, whether students are utilising it to understand their study material or to express thoughts. Based on the findings in this study, the element of use was more prevalent than the others. It was expected that use would be demonstrated more because the ultimate purpose of language is its use in different contexts and not in a vacuum, but the magnitude of use as displayed in the data exceeded expectations.

Firstly, the participants relished the examples provided for the use of the different words of the day; they declared that the examples were helpful as they could see how to use the newly learned words in various ways. What was more critical, however, was the participants'

application of the words to real-life situations as they exchanged ideas about the words. The new words were used in relation to current affairs in politics, culture, past experiences as well as everyday realities. They reaffirmed how they would use the new words with confidence as they noted how they had sometimes used the words incorrectly in the past.

Secondly, the participants were able to use the new vocabulary in activities where they were required to construct their own sentences and paragraphs. Over and above activities, the participants used past words in their posts with group members. It was also found that normal chat conversations seamlessly included past words, which were used correctly. The participants were recycling past words and were doing so appropriately in each context.

Another instance of word use was noted in the distinction between meaning and use regarding appropriateness. As an illustration of appropriate use, once during the study, there was a discussion on '*luscious'* as the word of the day. The discussion included why it would be inappropriate to describe a beautiful woman as luscious. Such discussions around the use of a word often included reflections from the participants as they admitted to being able to use a certain word appropriately.

What transpired from the findings was that the knowledge of a word is incomplete, indeed insufficient, without a focus on use in various contexts. Unfortunately, this is how most vocabulary classes and indeed vocabulary apps are designed; only focusing on form and meaning. It seems we are merely scratching the surface if we teach form and meaning or even providing an L1 equivalent because the word usage is important in selecting the most appropriate word for certain contexts. It is important for vocabulary teaching to cater for the different dimensions of word knowledge. In short, the findings supported research in vocabulary teaching and learning based on reviews of research, which stresses the limited effectiveness of instruction that is confined to dictionary definitions. The findings in this study affirmed current research, which supports instruction that presents words in a variety of contexts, by means of multiple exposures and provision of opportunities for the students to process and apply their new knowledge through activities and exercises (Beck, McKeown, & Kucan, 2013).

6.3.1.2 Interaction

Vocabulary learning was also enhanced through social interaction. The WhatsApp discussions are mainly apportioned to the social presence because of the prevalence of

student-student as well as student-teacher interaction. Over and above human-human interaction, however, the findings revealed human-device as well as human-content interaction. Interaction "is a defining characteristic of education" (Moore, 1989: 2). The important role of interaction was supported by Oxford and Scarcella (1994) who stated that interaction plays a crucial role in vocabulary learning specifically and language learning in general. Oxford and Scarcela proceed to assert that "knowing an L2 word also involves being able to use the word communicatively in the context of purposeful interaction." (1994: 232). While the findings in this study demonstrated how use was facilitated through interaction, they also illustrated that interaction is key for successful ODL contexts (Makoe, 2012).

Because this study is based on the CoI as a theoretical framework and on DBR which emphasises review of theories and frameworks, as a methodology, the findings on interaction called into question the definition of the fundamental basis of CoI with reference to the concepts of community and inquiry. The first concept of community is described as "having mutual interdependence among members, connectedness, interactivity, overlapping histories among members, spirit, trust, common expectations, and shared values and beliefs" (Rovai, 2002: 42). This description, while accommodating the human-human interaction, seems to preclude the existence of human-non-human interaction, where for example mutual interdependence is likely to take place between people: it would be unlikely to have a device trusting a person. Yet, in this study, the findings show the CoI being successfully used for vocabulary teaching and learning between an individual and a device. This finding necessities a view of 'members' in the community as including non-human members. The idea of interdependence between a user and a device is not far-fetched since the user depends on the device for providing learning while the device depends on the user's correct use in order to provide the said learning.

The second component of CoI, inquiry, is defined as a process leading to the growth of human knowledge (Petrie, 1981). This definition would have accommodated human and non-human interaction had it not been for the emphasis on 'collective' knowledge (Garrison, 2013: 5). Garrison continues to point out, "inquiry inherently focuses on the precepts of community and collaboration." (2013: 5). This statement, again, seems to place emphasis upon inquiry as intrinsically collaborative.

WhatsApp provided an environment that facilitated mainly student-content, student-student as well as student-lecturer interaction. The findings revealed how WhatsApp allowed the participants to conveniently access vocabulary lessons and assessment; exchange ideas with peers as well as exchange ideas with the facilitator. Crucial in the data, however, was the role of the social presence in facilitating teaching presence and cognitive presence. While the participants exchanged ideas within the social presence, they were progressing from a sense of puzzlement towards resolution found in the cognitive presence (Garrison & Arbaugh, 2007). Through interaction within the social presence, the participants, including the teacher, were involved in direct instruction as facilitated discourse. Perhaps the most significant finding in this study was the nature of interaction within the social presence. The findings supported literature regarding the purposeful nature of interaction in the social presence. Although the findings revealed that the participants used WhatsApp to support, encourage and build a collegial atmosphere, their chat exchanges were mainly intended for group cohesion, which is exchanging ideas for learning. This study supported the notion that interaction was not limited to purposes of socio-emotional support, but it was primarily for learning as argued by Garrison and Arbaugh: "Although socio-emotional communication may be important, it is not sufficient for educational purposes" (2007: 161).

The second crucial finding that is related to interaction on WhatsApp relates to participants' activities on WhatsApp. Research acknowledges the benefits of WhatsApp across varied contexts such as in hospitals with doctors and surgeons exchanging reports about patients and shifts (Johnston, King, Arora, Behar, Athanasiou, Sevdalis & Darzi, 2015); at school with teachers and students for teaching and learning (Bouhnik & Deshen, 2014); in higher education among students (Yeboah & Ewur, 2014) as well as among domestic workers who are ODL students (Susilo, 2014). All these studies support the findings in this study that WhatsApp presents the potential for teaching and learning in ODL, most especially because of its interaction affordances.

While this study affirmed past research on the positive benefits of using WhatsApp such as ease of access to the content and interaction with the teacher and peers (Mazer, Murphy & Simonds, 2010), it refuted most of the findings associated with WhatsApp as a social networking site. Firstly, research has found that WhatsApp was popular for entertainment purposes such as sharing jokes and funny messages (Soliman & Salem, 2014). The findings in

this study did not reveal any chats with forwarded jokes or entertainment messages. The chats and posts were focused on the vocabulary, with some exchanges devoted to building collegiality among group members. This finding speaks directly to the group cohesion aspect of the social presence where socialising is not merely a space for a socio-emotional outlet. This finding also addresses the teacher's role in the cognitive presence through planning the intervention, direct instruction and facilitating discourse within the teaching presence.

The role of the teacher in planning and facilitating discourse on WhatsApp was evident in the findings as ensuring that the discussions focussed on teaching and learning. This finding counters previous ones where WhatsApp has been seen to grab the attention of users and divert it towards non-educational, unethical and inappropriate actions such as useless chatting (Kuppuswamy & Narayan, 2010). Inasmuch as these findings address the possibly arduous role of the lecturer in planning and facilitating instruction (O'Rourke, 2009), they also speak to the type of student engaged in interaction on WhatsApp. The ODL participants in this study wanted to invest in their education and did not have the luxury of wasting time in non-educational activities. While the participants acknowledged that prior to the study, they had used WhatsApp for socialising with friends and family, they appropriated its use for learning since they benefited from exchanging ideas and images for facilitating learning. This study, thus, confirmed Brown and Mbati's assertion that "m-learning holds much promise and provides exciting opportunities for open and distance learning" (2015: 116).

6.3.1.3 Assessment

This discussion would not be complete without a section on the role of assessment in vocabulary learning as pertaining to this study. Of the principles of vocabulary teaching and learning, assessment was the most illuminating with regard to data relating to it.

As mentioned earlier, data in this study showed that exercises facilitated the social presence as well as the cognitive presence, in that the participants discussed exercises concerning a better understanding and application of new words. The exercises also aided the participants to notice gaps in meaning and or knowledge of use. As they answered exercises and shared ideas, the participants would discuss options and realise that perhaps they had not quite understood the word of the day. In the case of gaps, the participants would either revisit the definition and example sentences or ask the group for clarity. It was a victory moment to see a participant self-correcting after reviewing their answers.

The exercises also emphasised the need for flexibility and a need for offering options in ODL. While the participants enjoyed exchanging ideas and discussing exercises on WhatsApp, there remained a concern that if someone delayed in sending their answers to the group, seeing other people's answers on the group derailed their thoughts and they would concede to answers before applying their minds to the exercise. The exercises on VocUp, therefore, provided a space where the shy or independent participants could work on the exercises by themselves. While there was agreement that VocUp was sufficient for learning and engaging in exercises, some students still felt that after working on the exercises on VocUp, they proceeded to join the group on WhatsApp and could justify their answers with confidence.

It was noted that the exercises were a confidence booster when one of the participants stated as much. Upon further inquiry during the interviews, it was explained that answering all the questions correctly was an affirmation that one has earnestly mastered knowledge of a word. The same confidence was evident when the participants wrote sentences and paragraphs and received commendations on their use of the newly learned vocabulary. If the gaps in understanding were pointed out, the participants worked at these until they could show that they had grasped a word.

The main, unexpected, finding in this study was the participants' requests for added exercises. This was a striking finding because research had stressed that ODL students face time constraints (Prinsloo & van Rooyen, 2007) as they have personal, work, family and social commitments to attend to over and above their studies. Indeed, in this study, one of the main findings was their limited time (Cross, 1981; Garland, 2007). In fact, Fozdar and Kumar (2007) posit that lack of time was the main reason for students' dropping out in ODL. The assessment exercises were designed according to the seminal works of Thornton and Houser (2001) who had highlighted spaced intervals with each bite-sized chunk of pushed material providing a short lesson (word capsules in this study). The answer to the dilemma of limited time combined with requests for more exercises essentially rested with the students themselves.

Firstly, ODL students know what they want. They are aware of their vocabulary deficiencies and, supported by surveys from intensive language teaching contexts, ODL students desire more vocabulary instruction (Green & Meara, 1995). The first portion of the answer is that ODL students are aware that much as they face time restrictions, there is value in investing

in improving their vocabulary. Their decision to use their limited time and financial resources and invest in their education is evidence enough that they know what they need and are willing to request it and pursue it. The second answer to the time conundrum relates to content, on the surface, but also has implications for the delivery of the vocabulary content. The participants learned from the vocabulary content inasmuch as they enjoyed the lessons. Over and above the lessons, however, they were accessing the lessons from a medium that was not disruptive of their daily activities. The vocabulary learning technology was integrated into their lifestyle and they could conveniently access content whenever and wherever. In other words, even though the content could have been enhanced, the access was still sufficiently flexible to adapt to their lives. This is the crux of mlearning in ODL: that it provides the flexibility that is or should be immanent in ODL's openness.

The students learned one word each day; three lessons on spaced intervals each day relating to the word of the day focused on form and meaning. The words were sent through SMS, but the students could also access the lessons via email on the computer. Apposite to this discussion was the finding that those who accessed their lessons on the computer did not engage with the lessons immediately, and most importantly, they did not manage to finish all activities for the day. It is this study's argument, therefore, that accessing the material on the computer is not as seamless and as convenient as accessing it on the mobile phone. While the participants in this study had one word per day, with three main sections of the lesson focusing on form, meaning and use, they not only managed to cover all the activities, but they wanted more. The mobile phone, therefore, makes a difference to the amount of content that the student can cover in his or her own time.

The response to the first research question is two-fold in that it addresses the components of vocabulary knowledge as well as the principles guiding vocabulary teaching and learning. The participants reported that the vocabulary activities were helpful and enjoyable, while evidence that they had learned the vocabulary was found in how they were able to recycle learned words and use them in various contexts. Vocabulary learning, in the data, highlighted the role of the teacher in the systematic planning, teaching and assessing of vocabulary. Moreover, the exercises exhibited a multifaceted role that moved beyond testing for understanding, but also facilitated interaction and included affective benefits.

What was quite notable in this study was the fact that ODL students, who are constantly supposed not to have sufficient time for their studies, recognised the value of investing in the learning of vocabulary. They appreciate that they can have increased access and interaction with content if it is delivered in a flexible mode such as mlearning. In short, the response to the first research question is that ODL students benefit and enjoy learning vocabulary in all its dimensions, in context, through including testing and using the flexible affordances of mlearning. Importantly, even though ODL students face a multitude of constraints, which often lead to their dropping out, most of which relate to time, the same students welcome and request more study material. This point indicates a greater need for careful planning of interventions because over and above content, the medium of delivery determines demand and level of engagement.

6.3.1.4 Opportunities for mlearning for vocabulary teaching and learning in ODL

This study discovered various promising opportunities for mlearning in ODL. The findings in terms of the device presence presented a type of interaction that is not very common in literature, human-device and human-content. The human-device interaction was identified in how the participants interacted with the phone as well as VocUp while they learned vocabulary. This type of interaction supported previous studies on the critical role of interaction for student support (Heydenrych & Prinsloo, 2010). As the participants used VocUp without the presence of a teacher or other students, VocUp was sufficient to support vocabulary learning through the interactive user-interface. While this study supports the role of mlearning in facilitating interaction (Traxler, 2009; Lu, 2008), it also affirms the important role of the device in mlearning in that if designed correctly, the device could be self-sufficient in facilitating device-human (Hillman, Willis & Gunawardena, 1994) as well as content-human (Başoğlu & Akdemir, 2010) interaction. Putting so much onus on the device as an interaction facilitator is not the norm in a research area where interaction has been mostly associated with human-human interaction in the form of conversational dialogue (Holmberg, 1983); with collective development (Heydenrych & Prinsloo (2010) as well as with social, cognitive and teaching presence (Garrison, 2007). However, the findings in this study suggest the possibility of human-nonhuman interaction in learning and student support. This interaction supports Wegner's definition of interaction as "reciprocal events that require at least two objects and two actions. Interactions occur when these objects and events mutually influence one another" (Wagner, 1997: 8).

This calls one to review Heydenrych's assertion of the important role of the teacher in ODL where he stated, "The complete learning experience of distance education students is still dependent on sufficient interaction between student and educator" (2009: 34). The findings point towards a suggestion that the teacher plays a pivotal role prior to the actual interaction, in the planning stage, and that student-teacher interaction can be augmented through the student-device interaction as it was in the use of VocUp. However, the teacher plays a pivotal role in planning and designing the interventions as well as in ensuring the usability, functionality and accessibility of the app to facilitate device interaction. Perhaps this finding will allay anxieties that technology would make teachers extinct as robots and apps proliferate in learning spaces; this study emphasises that whether directly visible through student-teacher interaction or indirectly through planning, the role of the teacher is crucial in vocabulary learning, especially in ODL with its large student numbers. If lecturers have planned well and designed appropriately, then mlearning provides fit-for-purpose solutions for ODL through student-device and student-content interaction.

6.3.2 Designed app intervention- VocUp

In developing the intervention, it was ensured that the intervention was based on the principles of vocabulary teaching and learning including explicit vocabulary teaching, practice in vocabulary as well as assessment (Folse, 2010). These principles were realised using the CoI as a theoretical framework, which largely focuses on the social, cognitive as well as teaching presences. The participants themselves initiated repeated exposure when they used previous words in their own examples and in general chat discussions. Repeated exposure meant words were not only spelt or pronounced correctly, but were also understood and used repeatedly, appropriately and in a variety of contexts.

6.3.2.1 Explicit vocabulary teaching

Explicit teaching, in terms of the teaching presence, was facilitated by the multi-componential nature of vocabulary knowledge. The study confirmed that designing content for mlearning calls for special skills because "the short-term nature and split attention require material that is designed for that purpose, not just re-packaged" (Kukulska-Hulme 2010: 9). The Word Capsules, encapsulating form, meaning and use, were complete lessons created for the compact mobile phone screen. Because of time constraints that are inherent in ODL, the participants appreciated the convenience of easily accessing concise yet

complete lessons whenever they had an opportunity. From the responses of the participants, the teaching presence was facilitated through both WhatsApp and VocUp during the design as well as the direct instruction phases.

6.3.2.2 Vocabulary practice

The second principle of practice, in the form of repeated exposure, is also called recurrent exposure in diverse contexts (Churchill, 2008). In developing VocUp, the designers ensured that the new words were spaced at consistent intervals and, thus, the participants anticipated new words every day. Because access was flexible, they were able to engage with the new words when they had the chance. The flexibility afforded by the mobile phone was important for the participants since they had other commitments. The principle of repeated exposure, therefore, took on a particular meaning for ODL students, that the teacher provides flexible opportunities for exposure with which the students can engage at their discretion. This reflected the openness in *Open* Distance Learning where students are learning in an environment that is open and allows them to enter and exit whenever and wherever they can. Practice, as part of teaching presence, was designed into the app so that there would not be a limit to the moments or quantity of access. Because the past words were recycled in subsequent sentence examples and exercises, the participants could encounter the words in multiple contexts. Furthermore, VocUp was designed to retain past words in the Past Words screen where users were able to retrieve past words easily to remind themselves of meaning and use. On WhatsApp, past words could also be accessed because WhatsApp retains posts and allows the user to email such posts for further filing.

Practice is closely related to the cognitive presence where a learner has to progress from a sense of puzzlement triggered by some confusion until he or she reaches a resolution where he or she can apply new knowledge to varied contexts. In designing VocUp, thus, the definition, examples and exercises were scaffolded, to gradually lead the users towards a stage where they were able to use the new words in new contexts, in the case of VocUp in exercises. While it is believed that learners could utilise the new words in contexts outside of VocUp, the most noticeable use for this study was in the exercises.

While this study reaffirmed Folse's (2010) assertion that the encounter with words involves remembering and recycling, it pointed to another type of repetition which is accompanied by visual cues, according to Folse (2010). The visuals could not be used on VocUp because it

was designed to be light on size for ease of download and use (to limit costs), but they were used effectively on WhatsApp. The participants who thrive on independent study appreciated that VocUp was sufficient in that they could learn, practice and cognitively develop on VocUp alone. The participants who preferred a more socially predisposed learning setting found WhatsApp to be more accommodating with regard to sharing audio and image elements. They experienced the added types of text as useful and enjoyable. The use of images, audio and emoticons aided the repeated exposure to concepts, which, as part of direct instruction, facilitated the teaching presence. The use of multimedia and mlearning also proved that explicit vocabulary teaching is not and should not be a dreary exercise: as Folse (2010) cautions, sometimes explicit vocabulary teaching is erroneously associated with boredom. The participants in this study stated that they looked forward to the new words and the activities associated with vocabulary learning, proving that design should consider elements that would make the material attractive to users.

6.3.2.3 Vocabulary assessment

The final pedagogic principle of assessment is that in this study different types of exercises were designed (Folse, 2006) in the form of recognition exercises (multiple choice questions) for VocUp and WhatsApp as well as production exercises (original sentence and paragraph writing) for WhatsApp. While research has proven that multiple choice question exercises yielded more retention of vocabulary (Kargozari & Ghaemi, 2011), the participants in this study reported benefiting from all types of exercises, indicating that they had learned much from doing the exercises. It was noted that the exercises in this study were not used merely to test understanding of the covered words, but that the exercises actually facilitated the cognitive as well as the social presence in the interaction among the participants, as they discussed their answers and argued about the correct ones. Exercises in this study, therefore, played a function that far supersedes that of judgement, but was one of facilitating learning through interaction.

In developing the app, the pedagogic aspects, as well as the technical quality features of VocUp, were considered important for mlearning while using the CoI as a framework. The device and system were crucial in this study since the users interact with the gadget for the delivery of content before interacting with the latter (Hillman, Willis & Gunawardena, 1994). The study illustrated the importance of paying attention to the design and development of

the apps. Issues such as security and safety in mlearning as well as reliability of systems were stressed as potential hindrances and deterrents to mlearning. It seems as if devices and systems are the first port of call so that, if not properly attended to, they could hamper even the most well-developed mlearning programmes. The response to the second research question, therefore involves not only the steps to the development of a programme, as presented the app development Chapter, but also the key characteristics of mlearning systems- as presented above. What is important is attention to detail in relation to the users, purpose as well as context.

6.3.3 Developing vocabulary through VocUp, WhatsApp and VocUp+WhatsApp

The participants enjoyed the novelty of the VocUp. Back at the turn of the millennium, Belt (2001) observed that after the novelty of the new technology had worn off, learners would see devices as working tools. In other words, there is room for excitement over the novelty of an innovation, after which the novelty has to be translated into the actual objective of that innovation: in the case of this study, to learn vocabulary. The participants were excited about using their phones to learn vocabulary and using the app to do that. They expressed their wonder and enjoyment that the app was interactive as they switched between screens and answered vocabulary exercises. Indeed, "novelty has its place" (Behera & Purulia, 2013: 28) and if a new way of learning vocabulary attracts and maintains the attention of students, then this is a benefit that needs to be explored in ODL where students are used to paper-based delivery (Esterhuizen, Blignaut & Ellis, 2013), occasionally using only a dictionary to learn vocabulary.

6.3.3.1 Benefits of mobile interventions

The advantage of both apps is that of accessibility and availability. Sarrab, Elbasir and Alnaeli (2016), explain, "Learners can access the required information irrespective of time and location" (2015: 102). After downloading, VocUp was available to participants in a reliable manner (Kitnav & Davcev, 2012). The app conformed to the quality measures, which are the same that added to the benefits of the app. The participants benefited from the consistent availability of the app because they could access it from early in the morning; during breaks at work; during errands such as visiting the bank; in the evening after the day's engagements and whenever or wherever they found an opportunity. The fact that the participants could also access the past words by going to the Past Words screen was an added benefit that they

appreciated. Availability is arguably the strongest appeal associated with mlearning (Sarrab, Elgamel & Aldabbas, 2012); this is the reason why the participants were vocal about the fact that they could easily access VocUp whenever they needed to and had the opportunity to. In sum, the accessibility of the app translated to convenience for the participants in that the app provided learning at their fingertips.

The analysed data showed that participants acknowledged the benefit of ease of use, learning to use the app as well as mastering error-free running of it (Dirin & Nieminen, 2013). Usability ensured that the participants, who otherwise have many other commitments, did not waste time trying to manoeuvre and navigate through a complicated system. While there were some barriers to access related to using VocUp, WhatsApp proved to be a more accessible means since the participants already had it installed on their phones and were familiar with using it. The participants also noted the benefit of WhatsApp in that the previous communications were easily accessible on WhatsApp and they were not deleted, unless purposefully so by the user. This was a major improvement from previous media associated with distance education such as the use of radio broadcasts, which did not provide a backup plan for students to refer to after the broadcast had ended (Kajumbula, 2006).

The most remarkable aspect of accessibility in this study was its association with exclusion. The participants' responses to WhatsApp showed that they viewed it as opening access to more people to participate in the learning. Accessibility is especially poignant in ODL where students already feel at the periphery of higher education; they seem to have been denied access to higher education due to time, financial and social constraints (Rumble, 2000). According to Letseka and Pitsoe (2014), had it not been for ODL, the majority of students would not have had access to higher education; they include those "who were previously excluded from accessing higher education opportunities by conditions beyond their control" (2014: 1942). The use of WhatsApp made participants feel accommodated. For a student who has been unable to access education, and now who feels not able to access vocabulary lessons on VocUp, WhatsApp was not merely a forum for accessing vocabulary, it was the epitome of ODL.

Another benefit associated with VocUp was the facilitation of learning. In essence, the driving force behind the development of VocUp was to teach vocabulary. The participants

anticipated new words and learned from them. They also found the example sentences beneficial in exemplifying the word's usage. They also regarded the exercises as beneficial in testing their understanding. What was deemed more beneficial, however, was the interactivity in the exercises. While designing the app and the instruction that if an incorrect option is chosen it shakes and turns red, the concept was for the app to be fun to use. What was considered fun turned out to be a beneficial interactive tool that made studying on one's own in ODL more meaningful as it facilitated interaction. This benefit is reminiscent of the responsibility placed on the practitioners, not only to introduce mlearning or other technologies for the hype or the availability or usability, but for learning. Brown substantiates this assertion by stating, "The ability of educationists to design and develop didactical sound m-learning opportunities and environments that enhances learning is imperative" (2003: 9).

A further benefit associated with VocUp was that it facilitated interaction. It is acknowledged at this point that interaction is usually associated with bi-directional human-human engagement as in the examples of student-student and student-teacher interaction. The human engagement view of interaction is thus exemplified by Thurmond (2003) who defines student-student interaction as an interaction between one student with another student, with or without the real presence of the instructor. If this view of interaction is adopted, VocUp does not fit in with interaction because the user does not seem to be overtly exchanging ideas with any human when they use VocUp. In this study, however, the interaction in VocUp was expressed so vividly by the participants that it could not be ignored. Participants noted that VocUp alerted them to the availability of a new word each morning, which means VocUp beckoned the participants' attention, in a similar way to that in which a teacher would draw students' attention.

Most important, though, was VocUp's ability to engage a user and promptly alert him or her when the user had chosen an incorrect option in the exercises. The participants highlighted that they loved the shaking of the wrong option and how it turned red, immediately pointing to a gap in understanding. The user would subsequently refer to the definition or examples or past words and then try answering the question again. If the answer turned green the user would immediately know he or she was correct. While this back and forth negotiation between user, device and content, facilitated the cognitive presence, it also pointed to the

interaction that was hardly human-human, but human-device (Hillman, Willis & Gunawardena, 1994).

The interaction with content was highlighted by research, which drew attention to the relationship between the amount of interaction students experience with course content and their performance (Heffner & Cohen, 2005). While VocUp facilitated student-content and student-device interaction (Hillman, Willis & Gunawardena, 1994, WhatsApp facilitated student-content, student device, student-student and student-teacher interaction (Moore, 1989). The participants benefited from interacting with content on WhatsApp as they read and worked on words of the day and exchanged answers. Through WhatsApp, the participants exchanged ideas and learned together. The data evidenced WhatsApp discussions being used to encourage, support, cheer, admonish as well as to build a community. Over and above the affective space, WhatsApp discussions provided negotiated interaction, which led to knowledge creation, and sharing, what Garrison and Arbaugh (2007) call group cohesion. Participants also attended to more social interaction such as encouragement, reprimanding as well as congratulating each other. The participants, therefore, exchanged ideas on the word of the day as they tried to understand and apply the words; they expressed reproaches when others seemed not to be participating; they wished each other well when there was illness; they spurred each other on during examinations or when one wanted to give up; they consoled when others failed and they shared good news of passing and congratulated each other.

The participants also benefitted from exchanging ideas and using their first languages. They found the use of multiple languages, including the 11 official languages (PanSALB, 1995) as well as colloquial language in the form of Tsotsitaal (Mesthrie, 2014; Molamu, 2003) helpful. WhatsApp was beneficial in facilitating wide and flexible interaction in that the language use was accommodating and included the use of emojis to allow for meaningful interaction. The student-teacher interaction was another benefit associated with WhatsApp. It had been anticipated that the participants would enjoy and appreciate the presence of the teacher based on previous research (Shandu & Thoka, 2014) and because interaction bridged the isolation which is characteristic of ODL (Simpson, 2013). The participants lauded the knowledgeability of the facilitator with regard to subject matter and the ability to explain details. They also expressed thankfulness for the perceived care and attention that was

accorded them by the facilitator. Over and above facilitating learning, the instructor assumed the role of "cheerleader" as Andresen (2009: 251) puts it, especially when encouraging them to participate or wishing them well in exams; most of the perceived care and attention emanated from merely being present, being visible.

WhatsApp was also seen to be beneficial in that it facilitated the other aspect of the teaching presence: direct instruction. While planning and organisation, the other aspect of teaching presence, was mainly completed before the study, with some adjustments in organisation during the study, WhatsApp was beneficial mostly in direct instruction. The participants benefited from the teaching that happened on the forum. When the participants needed more explanations or examples, they exchanged ideas and appreciated the insight of the facilitator. At times, they would directly ask the facilitator to share her insight into the matter. By providing images as examples, voice notes for pronunciation and urging the participants to provide their own examples or images, teaching was facilitated and the participants benefited from this.

6.3.3.2 Challenges of using VocUp and WhatsApp

Despite these benefits, there were also drawbacks in using these applications. The response to challenges experienced with VocUp is two-fold in that it deals with the downloading of VocUp as well as the use of VocUp.

While the mobile phone is heralded as providing many possibilities for learning anytime and anywhere (Brown, 2003), the phone itself presented a barrier in that some participants could not download the app. One participant, for example, was using a Nokia Lumia which used to employ the Symbian and now uses the Windows operating system. Because VocUp is a native app developed on an Android operating system, the participant could not download the app. This problem was quickly resolved when the participant furnished me with an alternative number for his other cellphone. This proved that the proliferation of cellphones has surpassed population numbers, with most people owning more than one cellphone (International Telecommunication Union, 2016).

The second problem with the download process was related to the perceived costliness of downloading the app. The participants seemed to associate the concept of 'downloading' with exorbitant fees. The high costs of data are widely reported in the media globally

(Munbodh, 2016) and South Africa (Mozilla support, 2016) in particular. Some participants did not even attempt to download VocUp. It was during the virtual interviews that one participant revealed that she did not download the app as she thought it would be expensive. The preference for WhatsApp also revealed that some participants felt they did not have to use extra data to download VocUp when they could use WhatsApp, which they already had. This occurrence was termed *APPlification* or *APPropriation*, meaning multiplying the uses of one app in order to save costs on downloading another app. Financial constraints are a reality for ODL students, with several studies suggesting that "the psychological stress of economic challenges may play an even more important role in developing countries" (Subotzky & Prinsloo, 2011: 183). As a result, the students are mindful of not spending money on 'add-ons'.

The participants were also concerned with security in relation to downloading an unknown app onto one's phone. This was a valid concern in the light of malware and digital security. The reality is that mobile phones and the internet bring with them safety concerns because the "combination of criminals targeting mobile hardware and often unscanned apps is creating a possible recipe for more data disasters." (Schlesinger, 2015). The apprehension was so palpable that one participant felt she would not even attempt to use VocUp. In essence, security concerns prevented this participant "from capitalizing on the benefits that these technologies bring along." (Kambourakis: 2013: 68). The downloading challenges were manifested in certain participants' lack of familiarity with technology. Much as an orientation to the download and use of VocUp was provided, it became evident that some participants were not familiar with the technology of their mobile phones in relation to apps. It transpired that some participants were so familiar with the functions they normally use that they were wary, at best, and unable to download and use VocUp, at worst. This challenge resonates with the view of Squires (2014) who argues that most, if not all, challenges and shortcomings associated with mlearning are actually related to the users' comfort and familiarity with the technology used. This challenge of familiarity further highlighted the heterogeneity of the student profile. While some participants easily downloaded the app, even having insight and expertise into changing phone settings to allow the app to run on their phones, a few struggled, to the point of giving up on the app. This made me wonder how many students abandon resources not because the resources are

of no use, but because they have difficulty based on lack of familiarity. Once the downloading challenges were resolved, the participants who chose to continue using VocUp reported enjoyment and benefits without problems. The problems with using WhatsApp were related to internet connection, time restrictions as well as group participation.

Although participants were familiar with WhatsApp, they already had WhatsApp downloaded onto their phones and they had no trepidations about security issues, internet connection still presented problems for the participants. So important is internet connectivity that Khan, Al-khanjari, Sarrab and Al-Shihi argue: "If only attention is paid to designing and developing learning contents without studying the limitations of mobile device, internet connectivity, and usability the application will not be able to meet learning objective" (2016: 3). In this study, there were times when the mobile device was not a problem and usability was not an issue, but still, the participants could not engage in the learning based on limited or unavailable internet connection. The said challenge was sometimes due to participants either travelling and being out of range of an internet connection, or to participants running out of data and not being able to afford to purchase more. In short, the problems of data connectivity in this study were mainly associated with student mobility issues as well as financial issues.

The second challenge associated with WhatsApp access was the time constraint. The participants, as ODL students, have many obligations demanding their time and attention and, thus, their time is limited. While mlearning is touted as enabling real-time, learning which is not bound by time and space (Quinn, 2004), this study demonstrated that anytime and anywhere learning actually takes place within the confines of contextual issues. This study showed that even though the participants had their cellphones on their person, they were sometimes not able to engage in learning based on work commitments; study commitments; family responsibilities as well as health problems. This does not mean that mlearning did not benefit participants since, as will be shown in subsequent sections, mlearning offers ample benefits, but we have to be aware of some of the time constraints users are facing and could face. Mbatha (2016) supports this issue in ODL by listing the time constraint as one of the major challenges facing ODL students in general and Unisa students in particular.

Although group participation was one of the highlights of using WhatsApp, some participants had experienced problems. Some group members were distressed when they felt the other group members were not participating enough. One participant asked to be moved to another group when his group members were not too active. This problem is related to the isolation that is characteristic of ODL; the participants echoed that they expected WhatsApp to provide some interaction, which would lead to their mutual gain. In interviews, some participants went as far as suggesting that non-participating members should be removed from the group because they were not contributing to knowledge building and sharing. It was quite interesting to note that the participants who preferred to work only on VocUp were happy to work by themselves without worrying about group dynamics.

6.3.3.3 The hybrid model

While the participants found both benefits and drawbacks with both VocUp and WhatsApp, the benefits of using a hybrid version in mlearning are crucial. If both WhatsApp and VocUp are made available as part of the intervention, the flexibility of mlearning and ODL is realised in that the users have options. They are in control of their learning. In the hybrid model, the learners who prefer more human-human interaction are catered for while those who prefer independent study are also catered for. In true pragmatism, where we search for solutions that work, a student is able to opt for both applications where they learn and do exercises in private on VocUp and then proceed to WhatsApp where they can confidently engage with group members. Secondly, a hybrid approach caters for familiarity with technology in that users can begin with what is more familiar and gradually proceed to try the unfamiliar. It is evident that both VocUp and WhatsApp offer benefits and drawbacks. It should be reiterated, however, that using both these environments in a complementary manner has benefits and possibilities for mlearning.

While on the surface it might seem as if there were numerous challenges related to VocUp, it should be noted that the challenges were mainly related to the initial download stages and that at a deeper level, the challenges were propagated by the unfamiliarity with the technology. Pointing to unfamiliarity with technology by no means attenuates the detrimental consequences of the app crashing or the barriers to access, but rather points to the importance of the planning stage as well as the importance of the learner in the introduction of interventions that are purported to provide student support. It is imperative

that flexibility form part of student support so that the students have options. It seems futile to provide student support mechanisms that are not accessible to those who need it most. Engstrom and Tinto (2008) contend that access without support is not opportunity. While this argument is fully accepted, it is extended in this study with a proposal that *rigid access without options is not access* in ODL.

6.4 Conclusion

This Chapter presented the findings in this study as well as a discussion based on the key areas of this thesis. The findings based on the first and second iterations were used as a build-up and refinement for the third iteration of a hybrid VocUp + WhatsApp vocabulary intervention. The findings revealed that both the newly developed and existing apps offered benefits and challenges with regard to vocabulary teaching. In the third iteration, it was found that the three elements of CoI had to be revised to include device and learner presence as revealed by the findings. The revised CoI was found to be relevant to the context of ODL where the vocabulary interventions will be used.

CHAPTER 7: SYNTHESIS OF FINDINGS, RECOMMENDATIONS AND CONCLUSIONS

7.1 Introduction

This Chapter presents a synthesis of the findings and concluding reflections on this study as a whole. Following a summary of the findings, the Chapter considers the implications of the study. After detailing the contributions of the investigation and its limitations, the Chapter proceeds to recommend areas for further research. The significance of the study is then commented on, followed by a concluding reflection.

Research questions

To recapitulate, the main research question with which this study was preoccupied was: "How can vocabulary teaching and learning be supported through mobile applications in ODL?"

The sub-questions guiding this study were:

1. What are some of the principles foregrounding vocabulary teaching and learning?

2. What are the steps to designing a mobile-based vocabulary teaching and learning intervention that is suitable for an ODL context?

3. How do students respond to the use of mobile-based applications?

3.1 How is vocabulary learning enhanced through a newly designed vocabulary app – VocUp?

3.2 How is vocabulary learning enhanced through an existing app – WhatsApp?

3.3 How is vocabulary learning enhanced through a hybrid mobile learning model – WhatsApp and VocUp?

4. What guidelines can be established as a framework for supporting vocabulary teaching and learning through mobile technologies in ODL?

7.2 Synthesis and implications of findings

7.2.1 Research question 1

What are some of the principles foregrounding vocabulary teaching and learning?

Because vocabulary is a core element of language proficiency (Cahyono & Widiati, 2008), this study sought a systematic method of enhancing the former. The study found that vocabulary is engaged through explicit teaching of form (Folse, 2010; Oxford & Scarcella, 1994), meaning (Larsen-Freeman, 2003) and use (Nation, 2002). The study also established the importance of offering opportunities for repetition and rehearsal (Folse, 2004) where learners will use the newly learned words; the important role of interaction (Moore, 1989) and, finally, of making available opportunities for assessment (Folse, 2006; Kargozari & Ghaemi, 2011). While these principles were aligned with literature on vocabulary teaching, as adumbrated in the literature, they were proven true in the Presentation of Findings and Discussion above. In the ODL context of this study, it was found that the CoI, as a theoretical framework, provided the structure and reference for the core elements of vocabulary teaching and learning. It was in the social presence that the participants exchanged ideas and received feedback on their grasp of the new vocabulary. The teaching presence ensured that proper planning and facilitation of the actual teaching took place systematically. The cognitive presence ensured that the participants progressed from triggering events which caused confusion, to resolution where they could apply the newly learned words to new contexts. The newly added elements of CoI, device presence and learner presence highlighted the importance of context when new interventions are developed and implemented.

7.2.2 Research question 2

What are the steps to designing a mobile-based vocabulary teaching and learning intervention that is suitable for an ODL context?

The response to the second research question was two-pronged in that it dealt with the pedagogic as well as the technical aspects of teaching and learning vocabulary. While the vocabulary principles, as discussed in the first research question, distinguished VocUp from the array of available language and vocabulary learning apps that are available on the market, the technical aspects ensured that VocUp adhered to the quality checks relevant to mlearning technologies (Brown, 1992; 2004). It was a challenge to strike a balance between

technical and pedagogic principles. However, keeping the purpose of the app (inculcating vocabulary) firmly in mind helped the researcher to retain perspective. The qualities relating to the app were constructed, therefore, towards achieving this purpose. For example, the user interface, which was interactive, ensured that the feedback in the exercises would facilitate student-device and student-content interaction (Hillman, Willis & Gunawardena, 1994; Makoe, 2012).

7.2.3 Research question 3

How do students respond to the use of mobile-based applications?

This research question dealt with the implementation of the intervention in authentic contexts, most of all through its three cyclic iterations. The first iteration, VocUp, merely established benefits of VocUp relating to the excitement of the novelty of the app, accessibility, usability, facilitating learning and interaction. The challenges were mainly related to downloading the app, in the form of familiarity with the technology, data costs as well as security issues.

The second iteration, using WhatsApp for vocabulary teaching and learning, saw more human-human interaction as compared to the first one which had largely focused on device and student-content interaction. The human-human interaction was evident in students interacting among themselves as well as with the facilitator. While research has emphasised interaction in ODL (Heydenrych, 2009; Makoe, 2012), it was the role of assessment that was an unexpected finding in this study. Assessment played a notable role in facilitating the interaction between participants and with technology and content. As participants discussed options and answers for the exercises, the human-human interaction was facilitated on WhatsApp as part of the social presence. Within VocUp, assessment prompted device and content interaction as the participants worked through the exercises and VocUp responded by changing colours and shaking the options, depending on the option selected. The cognitive presence, therefore, was mostly facilitated through assessment. The iteration identified benefits relating to ease of use because of familiarity with WhatsApp, ease of access to content as well as human-human interaction. The challenge of lack of participation was the main issue with WhatsApp.

The third iteration was constructed on the foundations of the first two iterations where the benefits and challenges were utilised to refine the app. As a result, the third iteration

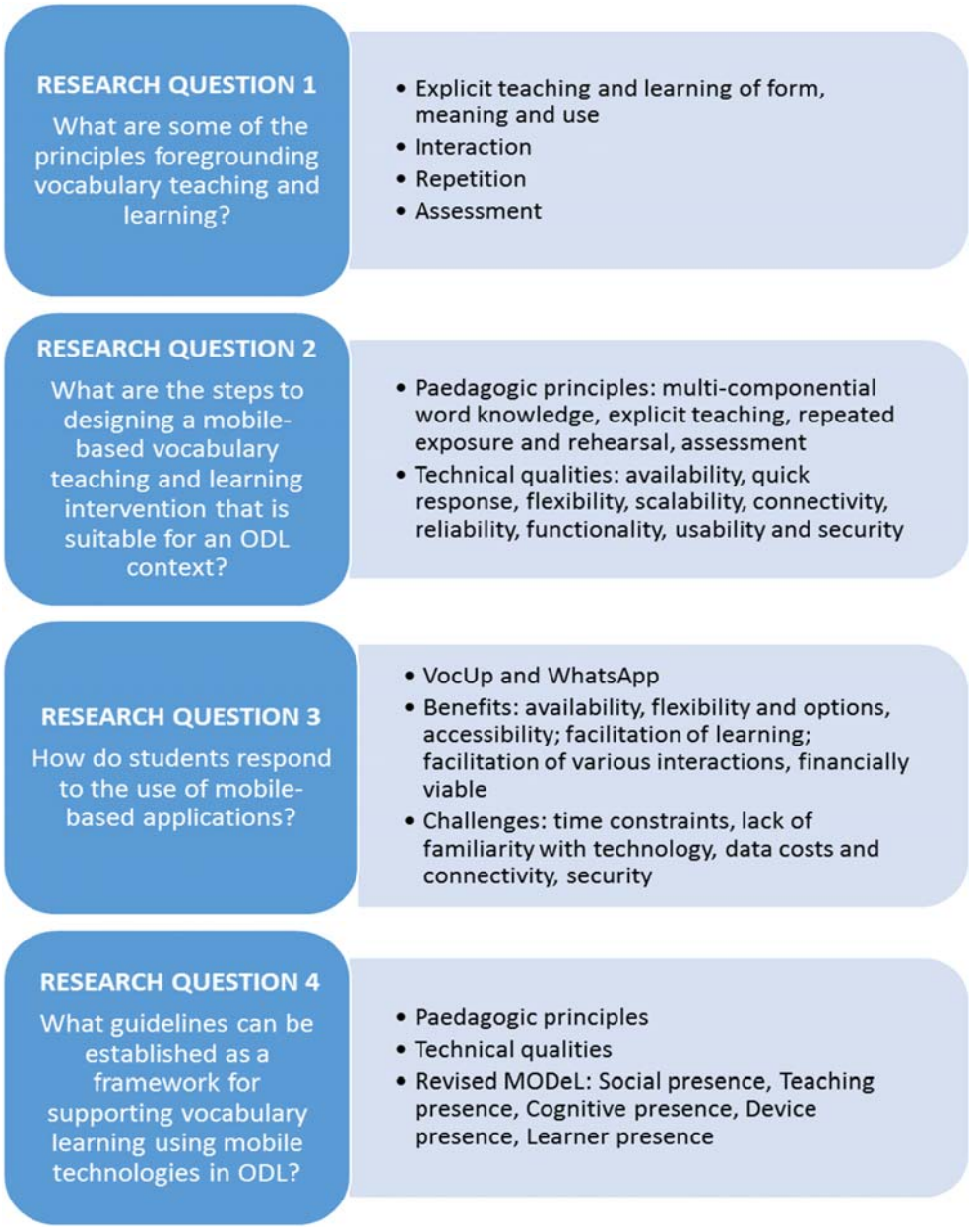
involved the use of both VocUp and WhatsApp in a complementary manner. This third iteration saw the vocabulary intervention providing flexibility and options to the varied types of students in ODL. This crucial finding resonates with Engstrom and Tinto (2008) who have contended that access without support is not opportunity. If interventions are developed to support students, then the same students should be granted flexible options of access which will be seamlessly supported. Because mlearning is built on the foundations of flexibility and anytime and anywhere learning (Park, 2011; Shippee & Keengwe, 2014) and ODL presupposes education that is openly accessible (Letseka and Pitsoe, 2014), the third iteration demonstrated that options are a requirement for ODL students. These provide a sense of educational inclusion which, if not attended to, is tantamount to human rights neglect for the ODL students who are assumed to have faced many other exclusions (Makhanya, Mays & Ryan, 2013). Students in the third iteration could choose, for example, to use VocUp and not interact with others if they were so inclined while benefiting from all the content. They could also choose, at their discretion, if they wanted to interact with others and compare answers.

7.2.4 Research Question 4

What guidelines can be established as a framework for supporting vocabulary teaching and learning through mobile technologies in ODL?

The fourth research question stemmed from the three research questions above. In remaining true to the DBR precepts in this reflection phase of DBR, the study presents refined artefacts as well as guiding principles for the implementation of interventions in authentic contexts (DBRC, 2003). Because this study is centred on ODL, the response to the fourth research question was based on the three principles of ODL including openness (Pityana, 2004); flexibility (Mbatha, 2015) and student-centredness (Letseka & Pitsoe, 2014; Tait, 2000). Since “effectively integrating technology into learning systems is much more complicated than for example providing computers and securing a connection to the internet” (Lim et al., 2013: 65), the response to the fourth research question demonstrates how technology can be effectively integrated into vocabulary learning interventions as shown in the Proposed *MODeL* below. Before proceeding to the proposed refined framework for vocabulary and mlearning in ODL, the following figure is provided as a summary and the synthesis of the findings.

Figure 7.1: Summary of findings



7.3 Proposed model for mlearning in Open Distance (and electronic) Learning

7.3.1 Background

Perhaps one of the flaws of technology, of whichever kind, is the hype and fascination surrounding the novelty of the innovation, which sometimes obscures and eclipses the amount of work needed to ensure that the innovation functions to achieve the purposes for which it is meant. The introduction of mobile phones for learning, thus, is not essentially about mobile phones and apps, but it does concern learning. The essence of this study is the

learning of vocabulary using electronic devices. The response to the fourth research question simultaneously serves the purpose of synthesis and evaluation. As a response, therefore, the section will review the key findings in this study against the principles of ODL: openness, learner-centredness and flexibility.

Through the CoI framework, it was evident that the social, teaching and cognitive elements of the inquiry play a crucial role in the teaching and learning of vocabulary in ODL. It was shown, for example, how the social presence was not limited to serving as a socio-emotional outlet, but it also served as facilitating learning through open communication, group cohesion and affective communication. The teaching presence was also manifested in the design and organisation of content, facilitated discourse as well as direct instruction since the participants expressed that they had gained much from the lessons.

The CoI played a crucial role in shaping this research, guiding the teaching intervention as well as aiding the articulation of the ideas in this area of research. Through data analysis, however, it became clear that there were aspects of data which were crucial to the research questions, which fell outside the scope of the CoI elements. As stated in the Analysis chapter, some researchers have validated the three original presences in CoI and added learner agency (Shea & Bidjerano, 2010), while additions regarding emotional presence have also been put forward (Cleveland-Innes & Campbell, 2012). Salmon (2000) deemed technical support as most important while Annand (2011) opted for a deletion of the social presence and the maintenance of teaching and learning presence.

The closest model that addressed the revision of the CoI was Koole's FRAME (2006). This was used because it articulated the elements that were missing in the CoI, yet were prominent in this study: the device and learner considerations.

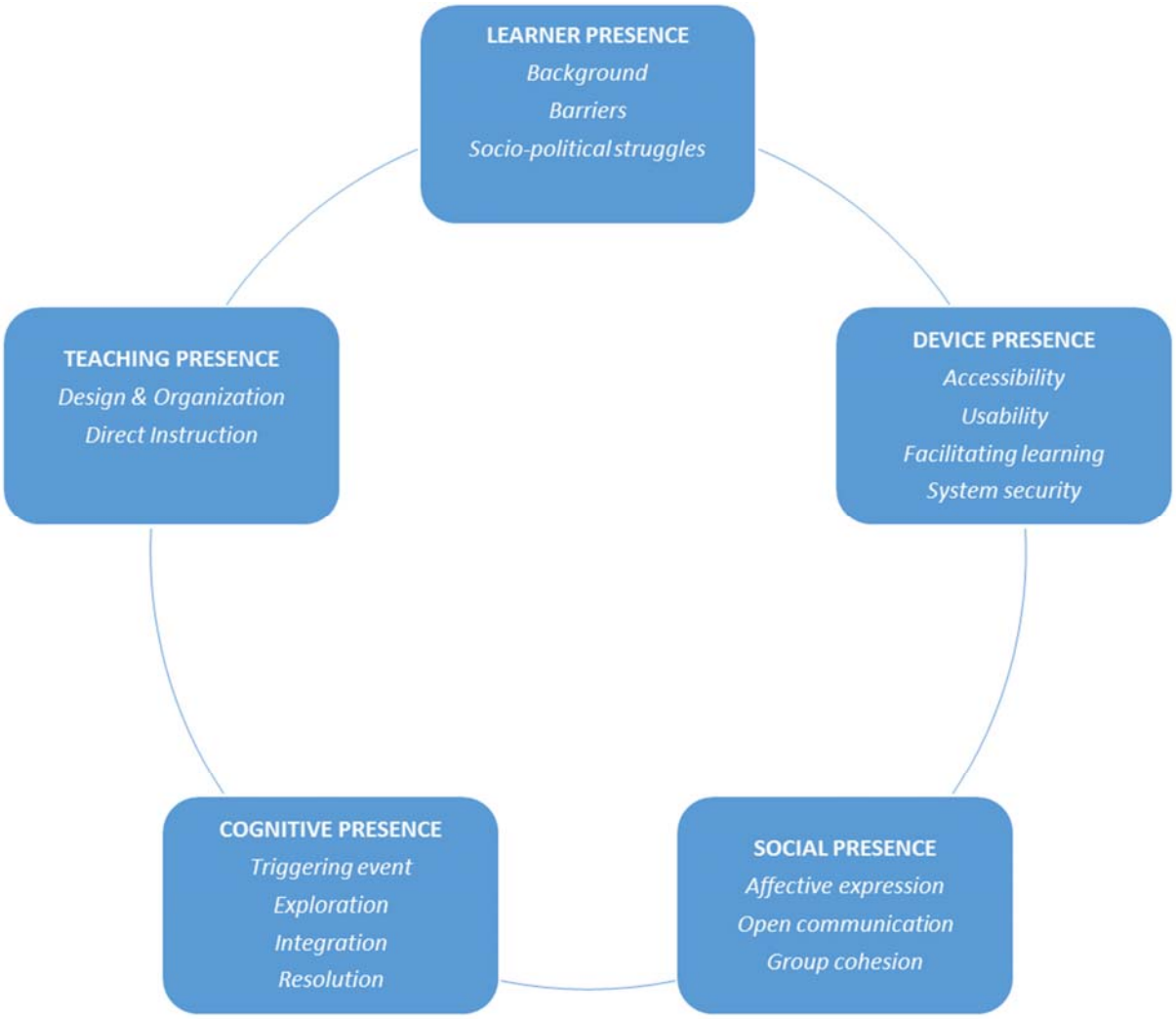
According to Koole, the device aspect of the FRAME "refers to the physical, technical, and functional characteristics of a mobile device" (2009: 28). The learner aspects "include prior knowledge, memory, context and transfer, discovery learning, and emotions and motivations" (2009: 30). It is at the intersection of the different aspects that the interconnectedness of the aspects is revealed (Koole, 2009). For example, the intersection of the device and learner aspect, the device usability, contains elements that belong to both the device aspect and the learner aspect (2009: 32). The reason a different model was opted

for instead of the FRAME was that the FRAME had excluded the cognitive and teaching presences from the original CoI. While it could be argued that teaching and cognitive development are implied in the intersection of the aspects, it was felt that teaching and cognitive development had to receive attention and stature equal to those of the device, the learner and even the social considerations. The following proposed model, therefore, is an adapted CoI which takes into account the equal status of the device as well as the learner in an inquiry into teaching and learning in ODL. This model uses data to propose an adaptation of what exists; hence it matches the context of this study. As Hsu and Ching state, “another aspect worth noting is the lack of mobile learning models or frameworks that factor in the needs of developing countries in mobile learning.” (2015: 14). There is a need, therefore, for models, which are cognizant of contextual variables, and which necessitate the adaptation of current models.

7.3.2 Features of the MODeL

In line with the precepts of DBR, therefore, and based on the data analysed in this study, the following model is proposed as an authentic one for mlearning in Open Distance (and electronic) Learning. It is named MODeL since it caters for the application not only in ODL, but also in those contexts that use mainly e-learning. It should be noted that, as a contribution to knowledge, the MODeL and its guiding principles are developed and revised from the CoI.

Figure 7.2: A Model for Mlearning in Open Distance (and electronic) Learning (MODeL)



7.3.3 Guiding principles for using MODeL

In line with the DBR prescripts, the following section presents practical examples of how to use the MODeL in authentic contexts. It is important to note that the elements of the MODeL are interrelated and work in synergy as part of mlearning interventions.

Learner presence

In one of his blogs, Anderson (2016) acknowledged that the argument by Shea and Bidjerano (2010) for the role of the learner in the CoI could be considered. In this study, the role of the learner was revealed in how the participants interacted with each other, with the facilitator as well as with the device. The learner variable not only affected the intervention, but also

determined whether and how the intervention was applied. The learner also determined the extent to which an intervention worked. In this study, the learner went as far as determining the technology that would best deliver the content. In short, no matter how well planned the content or how accessible the technology is deemed, neglecting the role of the learner may render some interventions unsuccessful. The learner variable includes the learner background, barriers as well as personal circumstances. It was in the said background that issues related to social justice were prevalent, which emphasises that underestimating the learner presence can potentially be construed as constricting the openness of ODL or the accessibility of mlearning.

Practical application

The most crucial practical application in the learner presence is to offer options in recognition of the varied profiles of students. In a mobile intervention that is mainly app-based, for example, one should make provisions for an offline version that will need a once-off download. Secondly, offer a link that will provide an option for human-human interaction for those learners who need that interaction. Thirdly, make room for learner feedback so that the intervention is constantly kept appealing, usable and relevant to the users.

Device presence

Because mlearning takes place within a device's environment, it is clear that the device, or at least the technology used, should receive attention as part of the community of inquiry leading to knowledge. Mobile telephones are inexpensive, accessible, and well positioned for the delivery of student support interventions (Fozdar and Kumar, 2007) and are in consequence well suited for student support in ODL. As an option for student support, the device presence consists of categories related to its usability, accessibility, facilitating of learning as well as security measures. Device presence as a crucial part of success in online learning brings the benefit of an environment that is available and accessible to the majority of students, as opposed to computers. Mobile devices are also accompanied by the benefit of familiarity since most students know how to use them. In this way, accessibility refers to both the device and the learning or student support material. Learning is facilitated in the device presence through the various types of interaction, depending on the learning

environment used at that particular time. The device presence, therefore, can bridge the distance gap that is characteristic of ODL.

Practical application

This study demonstrated how the device presence facilitated the teaching presence through VocUp and WhatsApp. On VocUp, the device provided the interactivity functions that allowed the users to learn their vocabulary and complete exercises. The direct teaching afforded by VocUp led to the cognitive development as the users interacted with content. On WhatsApp, the mobile device allowed for human-human interaction using instant messages. The users benefited from the views of others as they learned and applied new knowledge. Both VocUp and WhatsApp are easily accessible through the mobile device, allowing the users to access their learning wherever and whenever they can steal time away from their busy schedules.

Social presence

In the social presence, the members of the community project themselves as human beings (Rourke, Anderson, Garrison & Archer, 2001). These personal characteristics are seen in the categories of the social presence, which, to recapitulate, include affective expression, open communication and group cohesion. It is important to note that the social presence is not only concerned with the participants portraying themselves as real human beings through risk-free expressions and socio-emotional exchanges but is also mainly used as a space for collaboration towards cognitive development. Within group cohesion, while there could be socio-affective exchanges, the role of the interaction is for learning through "reciprocal events that require at least two objects and two actions. Interactions occur when these objects and events mutually influence one another" (Wagner, 1997: 8). In this study, as the participants were exchanging ideas on WhatsApp, therefore, they were learning from each other and developing cognitively. On VocUp, the social presence was not overtly evident, but it was implied while the participants interacted with the device and content as they developed their vocabulary.

Practical application

A practical example of using social presence for learning is to utilise it together with the teaching presence in the form of facilitated discourse through questions that probe

discussions. This study showed that assessment activities have the potential of probing interaction so that the use of exercises and questions directs and focuses the communication towards cognitive development.

Cognitive presence

The social presence plays a crucial role in the cognitive presence because it is in the interaction and collaboration that the exchange of ideas facilitates cognitive development. The cognitive presence is concerned with constructing meaning through sustained communication (Garrison, Anderson & Archer, 2001). The cognitive presence is marked by cognitive development from a sense of puzzlement towards a state where the learner can apply new knowledge. The puzzlement could be triggered by a question in the exercises, a comment by a peer or part of the teaching material. Between a triggering event that causes confusion and the resolution where the learner is able to use and apply new knowledge, there are exchanges in the community in the form of exploration and integration. The exchange of ideas refers to the different types of interaction including student-student, student-teacher, student-device and student-content. What is central in the progression from puzzlement to resolution is the feedback and exchange of ideas. In other words, the cognitive presence can be facilitated on WhatsApp where feedback is received from peers and teacher, and or on VocUp where feedback is provided by the functionality of the app, such as causing an incorrect answer to turn red and shake or the correct one to turn green.

Practical application

The one feature that facilitates development from confusion to application of new knowledge is the presence of feedback. Feedback could be given to confirm an answer or to prompt further exploration. Using exercises, for example, might prompt a triggering event as a participant suddenly realises that he or she does not know the answer to a question.

Teaching presence

The teaching presence refers to the design, facilitation, and direction of cognitive and social processes for achieving learning outcomes (Anderson, Liam, Garrison & Archer, 2001). This presence highlights the importance of the teacher in the planning, facilitation and direction of interventions. Whereas on WhatsApp, the teacher is visible throughout the three phases of the teaching presence as he or she directly teaches or steers conversations through

prompts and questions, on VocUp, the teacher's role is invested in the planning and developing the app and maintaining it. The role of the teacher, therefore, whether visible on WhatsApp or indirect on VocUp, is indispensable because it is the teacher's choice of the technology and content that affects the planning and implementation of the intervention.

Practical application

A practical example of the teaching presence is the way in which it facilitates the social as well as the cognitive presence. The selection and planning of the teaching programme affects how the cognitive presence will be developed, while direct teaching can assist participants to progress from confusion to resolution. The teacher's ability to direct instruction then helps to focus interaction in the social presence so that it is not purely for affective communication, but also facilitates group cohesion.

7.4 Implications of the study

Cellphones have become part of everyday life, with most people not being able to function without their pocket devices. Merchant (2012) illustrates this by observing, "we may see that mobile use is approaching the state, famously described by Heidegger as 'the blind man's cane,' in which a material object becomes the extension of the human being" (2012: 779). Cellphones have become a part of teaching and learning activities with many benefits, especially for ODL contexts. The capabilities of cellphone use for learning, thus, open up new challenges for exploring how the benefits of these ubiquitous devices can be harnessed as delivery for interventions in ODL. The contiguity of developments in cellphone technology with suppositions on whether or not cellphones are suitable for learning is summarised in the fact that as cellphones become more advanced, with added features, such features impact on how we use phones for teaching purposes. A few years ago, activities associated with mlearning were limited because mobile phone features were limited. Most mlearning activities have been confined to SMS-based activities, but with the advent of added features, cellphones are now able to offer more activities such as interaction through social media or self-study through apps. This study presents some implications for mlearning in ODL, related mainly to the affordances of mobile phones.

a) Mobile technologies offer many possibilities for teaching in learning in ODL, but to ensure their effective implementation, social, cognitive, teaching, device, as well as

learner considerations, must be carefully interwoven to ensure the effectiveness of the intervention.

b) Students in ODL have many other responsibilities vying for their attention in the form of time and money; financial and temporal constraints are prominent, among other challenges with which they grapple. They steal pockets of time to focus on learning and teachers should take care that they design convenient, appealing and time-conscious interventions so that those moments can be used effectively. This means that as we plan and facilitate learning, the content has to be easily and conveniently accessible for productive use when opportunities arise.

c) Vocabulary teaching and learning comprises various principles that should be applied as a word is taught in its multiple dimensions. Vocabulary teaching, therefore, should not be limited to form and meaning, but should include opportunities for use in multiple contexts. Particularly evident in this study is the necessity for the inclusion of exercises which serve for: assessing the students' grasp of the vocabulary; providing recycling opportunities; prompting further engagement; creating a triggering event which will lead to further cognitive enquiry; pointing to gaps in understanding or use as well as providing gratification when a learner sees that they answered a question correctly.

d) Interaction, be it among students, between students and teacher or between student and device, is crucial in teaching and learning, especially in ODL. It is vital, as established in this study, for interaction not to be limited to human-human interaction because human-device interaction is also viable and beneficial. Interaction, in addition, should not be limited to facilitating socio-emotional interaction, but should be used to facilitate group cohesion where participants learn together.

e) Students enrol in ODL because it promises flexibility, which can be adapted to their busy lifestyles. Mobile phones have not only become a part of everyday life, but also offer flexibility adjusted to users' lifestyles. Developers and teachers, therefore, should ensure that flexibility is part of any learning programme and delivery mode in ODL; giving students options is not an after-thought or a luxury, but is a necessity that equates to furthering social justice.

f) Students in ODL bring with them life experiences and expectations that should not be undermined or overlooked. There has to be a way of incorporating the students' preferences or, at the very least, acknowledging their contexts and prior knowledge.
g) Students come to an ODL institution to learn and to be taught; the role of the teacher cannot be superseded and surpassed by the technologies used. Whether the teaching is directly facilitated by the teacher or indirectly through technology (where a teacher plans and develops an app that will be interactive enough for the student to use by herself), teacher expertise, availability and technological savvy are to be looked into in greater detail.
h) Trust is an important aspect in ODL where the geographical distance is a marked characteristic. If students cannot trust the competence of the teachers or the interventions they present, then learning is hindered. Trust also affects the implementation of intervention where familiarity plays a crucial role. This calls for greater care in planning, designing and facilitation of interventions.

7.5 Contributions of the study

According to the precepts of DBR, the central goals of designing learning environments and developing theories or "prototheories" of learning are intertwined (Design-Based Collective, 2003). Because DBR implies outputs in the form of both knowledge and products (Herrington et al., 2007), the project's contributions to knowledge included practical output as well as scientific output.

7.5.1 Practical outputs: Designed artefact

The practical output in this study was the refined artefact of a hybrid mobile-based vocabulary learning intervention that is matched to the local needs of ODL. While VocUp and WhatsApp perform complementary roles, the remarkable feature of the artefact is that it can function excellently as a self-sufficient component of VocUp or of WhatsApp, depending on student needs. The intervention allows for the five components of the revised CoI and is flexible and convenient. The intervention as artefact is an important output for this study because in DBR, the product of design is viewed as a major output (Herrington et al., 2007).

7.5.2 Scientific output: Design principles

The focus on knowledge in DBR sets it apart from other research approaches and is realised in the design principles that could inform future development and implementation of such

interventions (van den Akker, 1999). The theoretical guidelines for the artefact in this study were realised in the revised theoretical framework adapted for ODL. Whereas the traditional CoI consisted of three elements, social, cognitive and teaching presence, the revised CoI added two others: device and learner presence. In order to facilitate future implementation in other similar contexts, the newly added elements also include categories to clarify the subcategories in each element. As guiding practical examples, each category consists of indicators.

Table 7.1 is a summary of the revised CoI.

ELEMENT	Categories	Indicators
TRADITIONAL COMMUNITY OF INQUIRY		
Social presence	Open communication	Risk-free expression
	Group cohesion	Encourage collaboration
	Affective communication	Emoticons
Cognitive presence	Triggering event	Sense of puzzlement
	Exploration	Information exchange
	Integration	Connecting ideas
	Resolution	Apply new ideas
Teaching presence	Design and organisation	Setting curriculum and methods
	Facilitating discourse	Sharing personal meaning
	Direct instruction	Focusing discussion
COMMUNITY OF INQUIRY ADAPTED FOR ODL		
Device presence	Accessibility	Convenient access
	Usability	Ease of use
	Facilitating learning	Enhancing teaching and learning
	Security	Device protection
		Content and user protection
Learner presence	Background	Acknowledge socio-economic dynamics
	Barriers	Offer options
	Socio-political struggles	Recognise personal realities

7.6 Limitations of the study

This study was aimed at investigating ways of supporting vocabulary teaching and learning through newly-developed and existing mobile applications. The research in this study was limited to students who were registered for a first-year English module. It was not the intention of this particular study to prove if the intervention improved the pass rates of the students, but rather it was focused on exploring how the intervention could provide support

by examining the experiences of the students. While it is acknowledged that students at Unisa face difficulties with regard to studying at distance and coping with language deficiencies, this study makes a contribution towards developing guidelines for using mobile technologies in student support interventions, language and otherwise.

The main threat to this study was researcher bias. In guarding against bias, the study relied on reflexivity, in other words, critical self-reflection to enhance awareness of any biases (Johnson & Christensen, 2004). Secondly, having been a participant in the data collection could have compromised data analysis. In mitigating bias, the study relied on three independent raters during the thematic analysis process, from coding to defining and naming themes. Finally, the findings in this study might be difficult to generalize owing to the sampling that involved a population from a single institution. It is envisaged, however, that the study will yield insight for the benefit of similar educational contexts as well as other contexts where mlearning interventions are to be implemented.

One of the ways in which the researcher attempted to control the scope of this study was to limit the number of vocabulary items to be studied, while focusing on form, meaning and use. Vocabulary teaching and learning involves many words and also encompasses many facets including motivation; psycholinguistics aspects; syllabus factors and individual differences in language learning (Carter & McCarthy, 2014); thus it was important to focus the study on the 10 000 word level of the VLT.

7.7 Significance of the study

This study's main significance is also its contribution, in that it developed a pedagogically grounded vocabulary learning app, which was based on quality technology measures. This artefact is significant because it not only offers potential to help students learning English vocabulary, but can be adapted for other contents as well. Another significant feature of this study was that it highlighted a systematic approach to vocabulary learning which is based on vocabulary development principles. The mlearning model of the hybrid VocUp with WhatsApp proved significant as an intervention for ODL where interaction, flexibility and accessibility are vital. This study highlighted the experiences of Unisa students with regard to mobile-based vocabulary teaching and learning. It harnessed the benefits of the latest mobile technology that is synonymous with the students' lifestyle by presenting a portable program that is accessible to students anytime and anywhere. It is significant in that it

attends to the students' need for an accessible intervention that deals with the isolation characteristic of ODL while empowering the students with the vocabulary necessary for them to cope at University. This study does not purport to solve all of the issues that Unisa students struggle with, nor does it offer a panacea for all the problems with which ODL students are faced, but it ultimately suggests guidelines towards a model that is accessible to equip the students with, at the very least, adequate academic vocabulary. This study will benefit the students who will use the programme to work on their vocabulary while creating and sharing knowledge with their peers, and by extension, will enhance their readiness for University study. This study will also benefit other practitioners and researchers as it contributes not only to the theory of vocabulary teaching and learning through mlearning, but also the practical examples of how to apply the principles in authentic contexts. This contribution is especially crucial for the less researched ODL contexts especially in developing countries.

7.8 Recommendations for further research

- The first recommendation for future research relates to one of the findings as regards the role of interaction and CoI as a theoretical framework with special reference to human and non-human interaction. It is crucial to investigate the relationship between inquiry as a collaborative exercise and community as a collaborative unit and how these relate to student-device and student-content interaction within CoI.
- Another area of research that is needed as a follow-up to this study is to test the application of VocUp in a variety of contexts including, but not limited to, subjects outside of language learning, post-graduate levels of study and countries outside of Africa.
- Research into the application of the revised five-element CoI is a plausible subsequent step in research, especially in a comparative environment with different types of learning, especially with respect to the disabled, rural and incarcerated students who form part of the student profile at Unisa.
- Another area of important research would be to investigate the institutional perspective into the implementation of mlearning interventions, specifically as encompassed in Unisa's ODL policy.

- Additionally, research into the lecturers' experiences of the intervention would provide a balanced perspective on the experiences of the students in this study.
- In hindsight, this study would have been enhanced by systematic observation procedures, which would have added insight into the interviews and WhatsApp chat analyses. An area of further probing, therefore, would be a research project that would include more varied forms of data collection and analysis.

7.9 Conclusion

This chapter presented a synthesis of the main findings related to this study. The main components of vocabulary learning, including the multi-componential, interaction and assessment, were attended to in relation to VocUp and WhatsApp. The findings were subsequently further synthesised to establish guidelines for mlearning together with vocabulary teaching and learning in ODL. In the true DBR tradition, the Chapter presented a refined framework in the form of the revised five-element CoI, in this study named MODeL, together with examples of practical application. Sections on implications, limitations, significance as well as recommendations for further research concluded this Chapter.

7.10 Personal reflections

For this final paragraph, I beg the reader's indulgence for the less academic style; I needed to balance the rational with some less rational reflections on this doctoral journey. The journey through this study has been an adventure of possibilities. From the possibilities explored in response to the problem where I could have used existing e-learning platforms such as the Unisa LMS to the option of using existing apps on the Play Store or App Store, there have been options at my disposal. I also had to choose a suitable theoretical framework and methodology from a range of possibilities, which could have been successful to some extent. Data collection and analyses also presented a myriad of choices. The choices I have made throughout this journey were informed by suitability and appropriateness to the context as well as the theoretical foundations of this study. This journey has, therefore, reinforced the importance of providing options to students with regard to interventions for student support. It is not a matter of providing support, but providing accessible and suitable support for those who need it most. What stands out from this journey is the power that an ODL institution has in changing the trajectories of people's lives. Where people could not have had an opportunity to study further due to their educational background as well as time and

financial constraints, ODL provides opportunities. Those opportunities, however, may be deemed nugatory if those students do not receive support. In all earnest, the ODL principles should be embodied in cognitive, affective and systematic support interventions. This research journey has repeatedly and poignantly pointed to the need for practitioners to explore accessible, flexible and student-centred ways of supporting ODL students. While this has been a journey of many discoveries, my apperception moment came when I realised that the number of interventions or the brilliance, thereof, is worthless if those interventions are not accessible, flexible or place the student at the centre of development and implementation.

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APPENDICES

APPENDIX 1: INFORMED CONSENT
Participation and informed consent leaflet

Researcher's name: Thulile Pearl Shandu

Student Number: 33807590

Department: English Studies, University of South Africa

TOPIC: DESIGNING AND IMPLEMENTING MOBILE-BASED INTERVENTIONS FOR ENHANCING ENGLISH VOCABULARY IN ODL

Dear Student

I am a PhD student in the Department of English, University of South Africa. I'd like to invite you to volunteer your participation in a research project regarding the use of a mobile app in developing the vocabulary of first-year students at Unisa.

Please read the contents of this letter in order to gain understanding of the research and what participating in the research will entail. Please contact me should you need further clarity.

NATURE AND PURPOSE OF THIS STUDY

This study will examine the impact of a mobile app on the participants' vocabulary. The study will also look into how the participants experience the vocabulary development mobile app.

EXPLANATION OF PROCEDURES TO BE FOLLOWED

If you choose to participate in this study you will be involved in the following activities:

- You will receive vocabulary building activities (one word a day)
- Discuss your experiences with your peers on WhatsApp
- Taking part in interviews.

RISK AND DISCOMFORT INVOLVED

There is no known risk for participating in this study except for the time you will spend in the vocabulary building exercises; questionnaire and interviews. Your time is highly appreciated and your input will provide invaluable insight which will help many others.

POSSIBLE BENEFITS OF THIS STUDY

The main benefit is that we will all contribute to knowledge and a better understanding of how mobile technologies affect learning in ODeL. As participants, you will get extra lessons on vocabulary and interact with your peers while critically reflecting on your learning.

WHAT ARE YOUR RIGHTS AS A PARTICIPANT IN THIS STUDY?

Your participation in this study is entirely voluntary and you can refuse to participate or stop at any time.

COMPENSATION

Your participation is voluntary. No compensation or contribution towards your expenses will be given for your participation. Your data costs will be reimbursed provided proof of payment is given to the researcher. It is expected that you will use no more than 500MB of data for the duration of the study.

CONFIDENTIALITY

All information obtained during the study is strictly confidential. Data that may be reported in scientific journals will not include any information that can identify you as a participant in this study.

HAS THE STUDY RECEIVED ETHICAL APPROVAL?

Yes.

INFORMATION AND CONTACT PERSON

If you have any questions during this study, please do not hesitate to approach the researcher.

Researcher: Thuli Shandu

Contact details: thulishandu@yahoo.com

Supervisors: Professors M Lephalala and M Makoe

If you agree to participate in the study, please fill out the consent form on the following page. You can email the completed forms to thulishandu@yahoo.com.

PARTICIPANT'S CONSENT FORM

TOPIC: DESIGNING AND IMPLEMENTING MOBILE-BASED INTERVENTIONS FOR ENHANCING ENGLISH VOCABULARY IN ODL

I,……hereby agree to participate in a study titled "*DESIGNING AND IMPLEMENTING MOBILE-BASED INTERVENTIONS FOR ENHANCING ENGLISH VOCABULARY IN ODL*". I hereby acknowledge that I am participating in this research voluntarily, and am aware that I may withdraw from the research at any time. I agree that the results be recorded on condition that anonymity and confidentiality will be maintained.

I understand that agreeing to take part means that I am willing to:

Participate in the activities.

Allow the interview to be recorded.

Make myself available for further interviews should that be required, and

Be informed about the research results.

I understand that the information provided by me shall remain confidential:

My participation is voluntary,

I can choose not to participate in part or all of the study, and

I can withdraw at any stage without being penalized or disadvantaged in any way.

Name of participant ……

Signature …….

Date …….

Name of researcher …….

Student number ……

Signature ……

Date ……

APPENDIX 2: ETHICAL CLEARANCE APPROVAL, UNISA

UNISA university of south africa

COLLEGE OF HUMAN SCIENCES RESEARCH ETHICS REVIEW COMMITTEE

14 April 2015

2015 CHS 03
Ms TP Shandu
Staff: 1122932

Dear Ms Shandu,

Decision: Ethics Approval

Name: Ms TP Shandu
Department of English Studies
shandtp@unisa.ac.za
012 429 6167/076 4036666

Proposal: Investigating the Use of M-Learning Technologies to Enhance the English Vocabulary of First-year Students in an ODL Context

Qualification: Postgraduate degree

Thank you for the application for research ethics clearance by the College of Human Sciences Research Ethics Review Committee. Final approval is granted for the duration of the research period as indicated in your application **after permission to conduct research has been granted by the Senate Research, Innovation and Higher Degrees Committee (SRIHDC)**.

The application was reviewed in compliance with the Unisa Policy on Research Ethics by the College of Human Sciences Research Ethics Review Committee on 2 April 2015.

The proposed research may commence with the proviso that:

1) *The researcher/s will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.*
2) *Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study, as well as changes in the methodology, should be communicated in writing to the (Name of unit/sub-unit) Ethics Review Committee. An amended application could be requested if there are substantial changes from the existing proposal, especially if those changes affect any of the study-related risks for*

University of South Africa
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PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150

the research participants.

3) The researcher will ensure that the research project adheres to any applic national legislation, professional codes of conduct, institutional guidelines scientific standards relevant to the specific field of study.

Note:

The reference number [top right corner of this communiqué] should be clearly indicate all forms of communication [e.g. Webmail, E-mail messages, letters] with the inter research participants, as well as with the College of Human Sciences Research Ethics Re Committee.

Kind regards,

Professor Tilman Dedering
Chair: CHS Ethics Review Committee
Department of History
Tel: +27 12 429 6869
Fax: +27 12 429 3221
Cell: 082 331 5608

Professor RMH Hoeksti
Executive Dean: College of Human Scien

Supported
2015/04/15

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www.unis

APPENDIX 3: WHATSAPP INTERVIEW QUESTIONS

First interview questions (Focus on VocUp)

1. You can say anything you want to say about your experience including:

    Experience downloading it

    How it looked
    How you felt about it

2. What were some of the problems with it?

3. What didn't you like about it?

4. What did you like about it?

5. What could I have done differently / how can the app be improved?

Second interview questions (focus on WhatsApp)

We learnt vocabulary over WhatsApp for a few weeks, please let me know about your experiences.

1. What is it that you liked the most about using WhatsApp for vocabulary development?

2. What is it that you didn't like about using WhatsApp for learning vocabulary?

3. What did you like the most about the new words and the lessons?

4. What is it that you did not like about the new words and the lessons?

5. What do you think I should change, fix or do differently to make vocabulary learning better?

6. Is there anything else you'd like to add?

APPENDIX 4: CONDENSED CURRICULUM VITAE

THULILE PEARL SHANDU (NDABA)

TERTIARY EDUCATION

2014 -	Registered for a DLitt et Phil in English Studies	Unisa, South Africa
2010	Masters- TESOL	MIIS, USA
1998	Bachelor of Paedagogics	University Of Zululand
1997	Research Methodology Certificate	University Of Zululand
1997	Secondary Teachers Diploma	University Of Zululand

EMPLOYMENT

2000-Present	**Lecturer** Department of English Studies	Unisa
2005 - 2007	**EFL Instructor** **Povey Centre for Intensive English Training** **University of South Africa**	Unisa
2011 - Present	**English Empowerment Workshop Facilitator**	Unisa
2002 - Present	**Freelance interpreter and translator**	South Africa
2007	**Reading and writing facilitator**	Addis Ababa, Ethiopia
2006	**Writing facilitator** National Department of Arts and Culture	Alexandra, South Africa
1998-2000	**English teacher (Grades 9-11)** Umlazi ComTech	Durban
1998-2000	**English ABET Tutor** Mayville	Durban

SOCIAL INVOLVEMENT

2010-Present	**English Teacher Empowerment Facilitator:** Umlambo Foundation-US Embassy	South Africa
2008-2009	**Volunteer** *Global Majority*	California, and Johannesburg,
2005-2006	**Language specialist** *Multichoice- Mindset*	Johannesburg, South Africa
2004-Present	**Team Leader** *Church Communications*	Pretoria, South Africa
2003	**Conference Rapporteur**	Pretoria, South Africa

AWARDS AND CERTIFICATES

2015	**Recipient** Academic Qualification Improvement Programme	Unisa
2014	**Certificate** Mentorship Programme	Unisa
		Unisa
2012	**Certificate** Excellence in Tuition Award	Unisa
2010	**Certificate** Young Academics Programme	
2002	**Certificate** Summer Education Training Institute	Ohio, USA
2008	**Recipient** Fulbright Scholarship	California, USA

PUBLICATIONS

2017. A glimpse into mobile learning in Open Distance Learning (South Africa). *Mobile Learning and Higher Education: Challenges in Context*. In print.

2015. Pregnancy, Horror and Terror in Quentin Tarantino's Kill Bill: Of Spiritual Rebirth and Poetic Justice in the Narratives of Metafilm. *Facing Our Darkness: Manifestations of Fear, Horror and Terror.*

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